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**WO 02/49993 A2**

(54) Title: HIGH AFFINITY SMALL MOLECULE C5a RECEPTOR MODULATORS

(57) Abstract: The invention includes low molecular weight, non-peptidic, non-peptidomimetic, organic molecules that can act as modulators of mammalian complement C5a receptors, preferably ones that act as high affinity C5a receptor ligands and also such ligands that can act as antagonists or inverse agonists of complement C5a receptors. Preferred compounds of the invention possess some or all of the following properties in that they are: 1) multi-aryl in structure; 2) heteroaryl in structure; 3) a pharmaceutically acceptable oral dose can provide a detectable in vivo effect; 4) comprise fewer than four or preferably no amide bonds, and 5) capable of habiting leukocyte chemotaxis at nanomolar or sub-nanomolar concentrations. The invention also includes pharmaceutical composition comprising such compounds and the use of such compounds in treating a variety of inflammatory and immune system disorders.

Title: HIGH AFFINITY SMALL MOLECULE C5A RECEPTOR MODULATORS

## **BACKGROUND**

### **Field of the Invention**

This invention relates to low molecular weight, non-peptidic, non-peptidomimetic, organic molecules that act as modulators of mammalian complement C5a receptors, preferably ones that act as high affinity C5a receptor ligands. The invention also relates to such ligands that act as antagonists (including inverse agonists) of complement C5a receptors, preferably human C5a receptors. This invention also relates to pharmaceutical compositions comprising such compounds. It further relates to the use of such compounds in treating a variety of inflammatory and immune system disorders. Additionally, this invention relates to the use such compounds as probes for the localization of C5a receptors.

### **Background of the Invention**

C5a, a 74 amino acid peptide, is generated in the complement cascade by the cleavage of the complement protein C5 by the complement C5 convertase enzyme. C5a has both anaphylatoxic (e.g., bronchoconstricting and vascular spasmogenic) and chemotactic effects. Therefore, it is active in engendering both the vascular and cellular phases of inflammatory responses. Because it is a plasma protein and, therefore, generally almost instantly available at a site of an inciting stimulus, it is a key mediator in terms of initiating the complex series of events that results in augmentation and amplification of an initial inflammatory stimulus. The anaphylatoxic and chemotactic effects of the C5a peptide are believed to be mediated through its interaction with the C5a receptor (CD88 antigen), a 52 kD membrane bound G-protein coupled receptor (GPCR). C5a is a potent chemoattractant for polymorphonuclear leukocytes, bringing neutrophils, basophils, eosinophils and monocytes to sites of inflammation and/or cellular injury. C5a is one of the most

potent chemotactic agents known for a wide variety of inflammatory cell types. C5a also "primes" or prepares neutrophils for various antibacterial functions, e.g., phagocytosis. Additionally, C5a stimulates the release of inflammatory mediators (e.g., histamines, TNF- $\alpha$ , IL-1, IL-6, IL-8, prostaglandins, and leukotrienes) and the release of lysosomal enzymes and other cytotoxic components from granulocytes. Among its other actions, C5a also promotes the production of activated oxygen radicals and the contraction of smooth muscle.

Considerable experimental evidence implicates increased levels of C5a in a number of autoimmune diseases and inflammatory and related disorders:

Antagonists that block the binding of C5a to its receptor or other agents, including inverse agonists, which modulate signal transduction associated with C5a-receptor interactions, can inhibit the pathogenic events, including chemotaxis, associated with anaphylatoxin activity contributing to such inflammatory and autoimmune conditions. Despite many attempts, no one has previously been able to provide any small molecule (less than 700 Daltons MW, or amu) non-peptide, non-peptidomimetic, non-peptoid, C5a antagonist that is essentially free of agonist activity at the C5a receptor and that exhibits a binding affinity for the C5a receptor of less than 1 micromolar, and preferably less than 100 nanomolar.

#### **Description of Related Art**

Certain modified C5a peptides (i.e., modifications of C5a) have been identified as partial C5a antagonists and have been shown to block a number of C5a mediated actions including neutrophil chemotaxis, neutropenia and superoxide formation. Various C5a peptidomimetic compounds have also been reported as modulating C5a activity, including cyclic peptoids (a peptoid is a peptidomimetic compound comprising an oligomeric assemblage of naturally occurring amino acids that have been N-substituted). Typically these C5a modulatory compounds exhibit a molecular weight greater than 500 Daltons, and generally greater than 700 Daltons.

**SUMMARY OF THE INVENTION**

The present invention provides novel compounds that are small molecule C5a receptor antagonists that are non-peptide, non-peptidomimetic, and are preferably free of C5a receptor agonist activity, which compounds exhibit high affinity for the C5a receptor, i.e., an affinity constant for binding to the C5a receptor of less than 1 micromolar. Highly preferred compounds exhibit very high affinity for the C5a receptor, i.e., an affinity constant for binding to the C5a receptor of less than 100 nanomolar. Preferred compounds are C5a receptor antagonists (including inverse agonists). Preferred antagonists exhibit an antagonist EC<sub>50</sub> (which as used herein includes IC<sub>50</sub>) of less than 1 micromolar, preferably less than 100 nanomolar, in an assay of C5a mediated chemotaxis. Preferred C5a receptors are mammalian, preferably primate receptors, including human C5a receptors, and may either be cloned, recombinantly expressed receptors or naturally expressed receptors. In certain preferred embodiments, compounds of the invention exhibit an affinity for human C5a receptors that is higher than for rodent C5a receptors, preferably at least five times higher, more preferably ten times higher.

The compounds of the present invention do not interact with dopamine receptors with even moderate affinity, i.e., they do not bind to dopamine receptors with K<sub>i</sub> values of less than 100 micromolar. Preferred compounds of the invention do not bind to any naturally occurring receptors other than C5a receptors with high affinity, and preferably they do not bind to any naturally occurring receptors other than C5a receptors with even moderate affinity.

In certain embodiments these compounds also possess one or more, and preferably two or more, three or more, four or more, or all of the following properties in that they are: 1) multi-aryl in structure (having a plurality of un-fused or fused aryl groups), 2) heteroaryl in structure, 3) orally available in vivo (such that a sub-lethal or preferably a pharmaceutically acceptable oral dose can provide a detectable in vivo effect such as a reduction of C5a-induced neutropenia), 4) comprised of fewer than four, preferably fewer than three, or fewer than two, or no amide bonds, and 5)



capable of inhibiting leukocyte chemotaxis at nanomolar concentrations and preferably at sub-nanomolar concentrations.

In a highly preferred aspect, the invention provides non-peptidic, non-peptidomimetic, low molecular weight compounds that act as high affinity antagonists of the human C5a receptor. Specifically exemplified representative compounds include, but are not limited to optionally substituted arylimidazoles (i.e. imidazoles having one or more ring substituents of optionally substituted carbocyclic aryl or optionally substituted heteroaryl), optionally substituted arylpyridyls (i.e. pyridyls having one or more ring substituents of optionally substituted carbocyclic aryl or optionally substituted heteroaryl), optionally substituted aryl-substituted cycloalkylimidazoles (i.e. cycloalkylimidazoles having one or more ring substituents of optionally substituted carbocyclic aryl or optionally substituted heteroaryl), optionally substituted arylpyrazoles (i.e. pyrazoles having one or more ring substituents of optionally substituted carbocyclic aryl or optionally substituted heteroaryl), optionally substituted benzimidazoles, optionally substituted aryl-substituted tetrahydroisoquinolines (i.e. tetrahydroisoquinolines having one or more ring substituents of optionally substituted carbocyclic aryl or optionally substituted heteroaryl), and optionally substituted biaryl carboxamides (i.e. a carboxamide that has one or more optionally substituted bi-carboxylic aryl or heteroaryl substituents). Novel intermediates useful for synthesizing compounds of the invention are also provided.

Preferred compounds of the invention are compounds of Formula I, shown below, that bind specifically, and preferably with high affinity, to C5a receptors.

The invention also provides pharmaceutical compositions comprising compounds of the invention, including those of Formula I, including optionally substituted arylimidazoles, optionally substituted arylpyridyls, optionally substituted aryl-substituted cycloalkylimidazoles, optionally substituted arylpyrazoles, optionally substituted benzimidazoles, optionally substituted aryl-substituted tetrahydroisoquinolines, and optionally substituted biaryl carboxamides. The C5a receptor antagonist compounds described herein are particularly useful in

the treatment of C5a-mediated inflammation, e.g., inflammation associated with various inflammatory and immune system disorders. The invention further comprises a method of treating a patient in need of such anti-inflammatory treatment or immune treatment an effective amount of a compound of the invention, e.g. an amount of a compound of the invention sufficient to yield a plasma concentration of the compound (or its active metabolite, if a pro-drug) high enough to inhibit white blood cell (e.g., neutrophil) chemotaxis *in vitro*. Treatment of humans, domesticated companion animals (pets) or livestock animals suffering such conditions with an effective amount of a compound of the invention is contemplated by the invention. For treating non-human animals of any particular species, a compound exhibiting high affinity for the C5a receptor of that particular species is preferred.

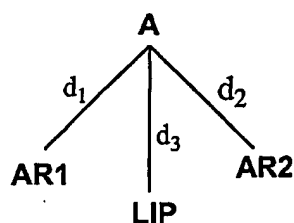
In a separate aspect, the invention provides methods of using compounds of the invention as positive controls in assays for receptor activity and using appropriately labeled compounds of the invention as probes for the localization of receptors, particularly C5a receptors, e.g., in tissue sections (e.g., via autoradiography) or *in vivo* (e.g., via positron emission tomography, PET, or single positron emission computed tomography, SPECT, scanning and imaging).

The invention provides compounds and compositions that are useful as inhibitors of C5a-mediated chemotaxis (e.g., they may be used as standards in assays of such chemotaxis). The invention additionally comprises methods of inhibiting C5a-mediated cellular chemotaxis, preferably leukocyte (e.g., neutrophil) chemotaxis. These methods comprise contacting white blood cells, particularly primate white blood cells, especially human white blood cells, with one or more compounds of the invention. Preferably the concentration is sufficient to inhibit chemotaxis of white blood cells in an *in vitro* chemotaxis assay, so that the levels of chemotaxis observed in a control assay (e.g., one to which a compound of the invention has not been added) are significantly higher (significantly here measured as  $p \leq 0.05$  using a conventional parametric statistical analysis method such as a

student's T-test) than the levels observed in an assay to which a compound of the invention has been added.

Accordingly, a broad aspect of the invention is directed to non-peptidic organic (carbon-containing) molecules, having a molecular mass of less than 700 amu, that exhibit C5a antagonist activity or C5a inverse agonist activity with an EC<sub>50</sub> of less than 500 nM in an assay of C5a mediated leukocyte chemotaxis.

More particularly the invention includes compounds of Formula I,



**Formula I**

wherein:

AR1 and AR2 are independently carbocyclic aryl or heteroaryl;

LIP represents an alkyl, carbocyclic aryl, heteroaryl, or arylalkyl;

A is oxygen or nitrogen;

d<sub>1</sub> represents the distance between A and the geometric center of AR1 and is

between 3 and 6 angstroms in at least one energetically accessible conformer of the compound;

d<sub>2</sub> represents the distance between A and the geometric center of AR2 and is

between 5 and 10 angstroms in at least one energetically accessible conformer of the compound; and

d<sub>3</sub> represents the distance between A and the nearest atom of LIP and is between 3 and 6 angstroms in at least one energetically accessible conformer of the compound. Preferred compounds of Formula I exhibit antagonist (including inverse agonist) activity at C5a Receptors, and essentially no or little agonist activity at this receptor. Preferably such compounds contain one or more heteroaryl rings.

Preferred compounds of the invention exhibit good activity in standard *in vitro* C5 receptor mediated chemotaxis assay, specifically the assay as specified in

Example 12, which follows and is defined below. Alternative preferred assays include the calcium mobilization assay. Preferred compounds of the invention exhibit an EC<sub>50</sub> of about 500 nM or less in such a standard C5a mediated chemotaxis assay, more preferably an EC<sub>50</sub> of about 200 nM or less in such a standard C5a mediated chemotaxis assay, still more preferably an EC<sub>50</sub> of about 100, 50, 25 and 10 nM in such a standard C5a mediated chemotaxis assay, even more preferably an EC<sub>50</sub> of about 5 nM in such a standard C5a mediated chemotaxis assay.

The invention includes additional methods such as methods for localizing C5a receptors in tissue section samples, comprising contacting a tissue sample with detectably labelled one or more compounds of the invention that are preferably detectably labeled, optionally washing the contacted tissue sample, and detecting the bound compound associated with the tissue sample. Suitable detectable labels include e.g. <sup>125</sup>I, tritium, <sup>32</sup>P, <sup>99</sup>Tc or the like. A variety of detection methods could be employed include single emission photon computed tomography ("SPECT").

Other aspects of the invention are discussed *infra*.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

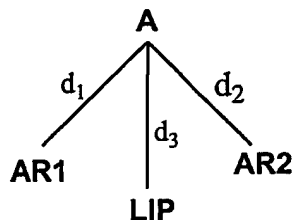
FIG. 1 is the sequence of SEQ ID NO-1.

#### **DETAILED DESCRIPTION OF THE INVENTION**

Preferred compounds of the invention include carbon-containing molecules that comprise:

- i) having a molecular mass of less than 700 amu;
  - ii) that is nonpeptidic;
  - iii) that exhibits C5a antagonist activity or C5a inverse agonist activity with an EC<sub>50</sub> of less than 500 nM in an assay of C5a mediated leukocyte chemotaxis;
- and
- iv) exhibits less than 10% intrinsic agonist activity in an assay of leukocyte chemotaxis.

Among such compounds, particularly preferred are those that contain one or more heteroaryl and/or carbocyclic rings. For example, preferred are compounds of the following formula:



AR1 and AR2 are independently optionally substituted carbocyclic aryl or optionally substituted heteroaryl;

LIP represents an optionally substituted alkyl, optionally substituted carbocyclic aryl, optionally substituted heteroaryl, or optionally substituted arylalkyl;

A is oxygen or nitrogen;

d<sub>1</sub> represents the distance between A and the geometric center of AR1 and is

between 3 and 6 angstroms in at least one energetically accessible conformer of the compound;

d<sub>2</sub> represents the distance between A and the geometric center of AR2 and is

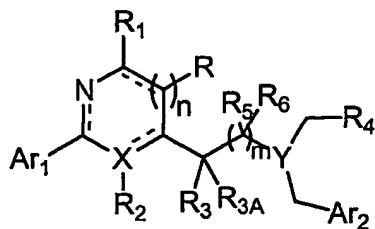
between 5 and 10 angstroms in at least one energetically accessible conformer of the compound; and

d<sub>3</sub> represents the distance between A and the nearest atom of LIP and is between 3

and 6 angstroms in at least one energetically accessible conformer of the compound.

Preferred compounds of the invention also include heterocycles of the following formula II :

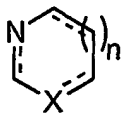
II



or a pharmaceutically acceptable salt thereof, wherein the compound exhibits an  $EC_{50}$  of 1  $\mu$ M or less in an assay of C5a mediated chemotaxis,

wherein:

the ring system represented by



is a 5 to 7 membered heterocycle that may be either aromatic or partially unsaturated;

X is N, C, or CR<sub>7</sub>, wherein R<sub>7</sub> is hydrogen, hydroxy, halogen, amino, cyano, nitro, optionally substituted haloalkyl, optionally substituted alkoxy, optionally substituted mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl or optionally substituted (cycloalkyl)alkyl;

Y is N or CH;

n is 0, 1, or 2;

m is 0, 1, or 2;

R and R<sub>1</sub> are independently chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, optionally substituted haloalkyl, optionally substituted alkoxy, optionally substituted mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl, optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, optionally substituted haloalkyl, optionally substituted alkoxy, optionally substituted mono- or dialkylamino, optionally substituted

alkyl, optionally substituted alkenyl, optionally substituted alkynyl,

optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

When n is 0, R<sub>1</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring,

each of which may be optionally substituted;

When n is 1, R and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring,

each of which may be optionally substituted;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl,

optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3

rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally

substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic

group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3

heteroatoms.

Preferred compounds of the above Formula II include those compounds

wherein:

R and R<sub>1</sub> are independently selected from

i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and

ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino,

iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen,

nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from

- i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and
- ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

R<sub>7</sub> is hydrogen, hydroxy, halogen, amino, cyano, nitro, or haloalkyl, or

R<sub>7</sub> is alkoxy, mono- or dialkylamino, alkyl, alkenyl, alkynyl or (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

When n is 0, R<sub>1</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino;

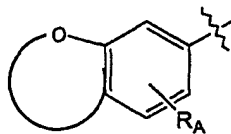
When n is 1, R<sub>2</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino; or



R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



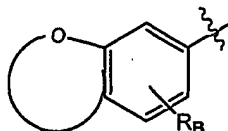
wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl,

mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl, and

ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino.

Additional preferred compounds of the above formula II include those wherein

R and  $R_1$  are independently selected from

- i) hydrogen, halogen, hydroxy, amino,  $C_1$ - $C_6$  alkoxy, mono- or di( $C_1$ - $C_6$ )alkylamino, cyano, nitro, haloalkyl, and
- ii)  $C_1$ - $C_8$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_3$ - $C_8$  cycloalkyl, and ( $C_3$ - $C_8$ )cycloalkyl)  $C_1$ - $C_3$  alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino,
- iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_8$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

When n is 0,  $R_1$  and  $R_3$  may be joined to form a  $C_3$ - $C_8$  cycloalkyl or  $C_3$ - $C_8$

heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano,

trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

When n is 1, R and R<sub>3</sub> may be joined to form a C<sub>3</sub>-C<sub>8</sub> cycloalkyl or C<sub>3</sub>-C<sub>8</sub>

heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

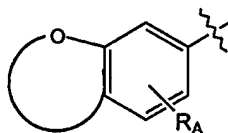
R<sub>7</sub> is hydrogen, hydroxy, halogen, amino, cyano, nitro, or haloalkyl,

R<sub>7</sub> is alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

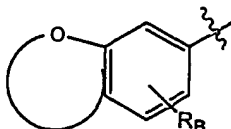


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl,

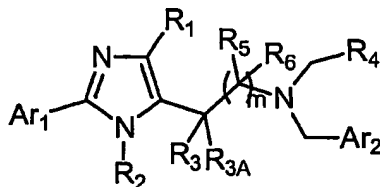
hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; and

ii) bicyclic oxygen-containing groups of the formula:

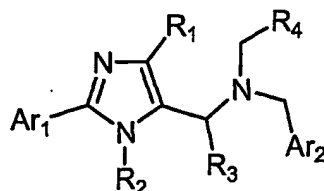


wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Still additional preferred compounds of the aboveformula II include those compounds of the following fomula:



and additionally include those compounds of the following formula:



m is 0, 1, or 2;

R<sub>1</sub> is chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl,

optionally substituted carbocyclic aryl, optionally substituted arylalkyl,  
optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3  
rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

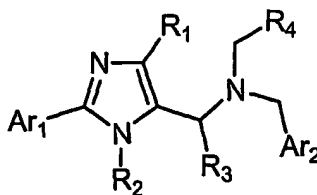
R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen,  
amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally  
substituted alkyl, optionally substituted alkenyl, optionally substituted  
alkynyl, optionally substituted cycloalkyl, and optionally substituted  
(cycloalkyl)alkyl;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be  
optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl,  
optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3  
rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally  
substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic  
group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3  
heteroatoms.

Additional preferred compounds of the above formula II include those  
compounds of the following formula:



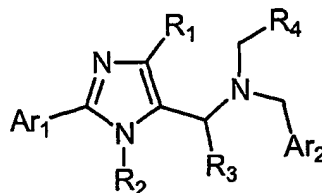
wherein:

R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub>  
alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl.

Additional preferred compounds of the above formula II include those compounds of the following formula:



wherein:

Ar<sub>1</sub> is phenyl, phenylalkyl, thienyl, imidazolyl, pyridyl, pyrimidyl, benzodioxinyl, benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 2;

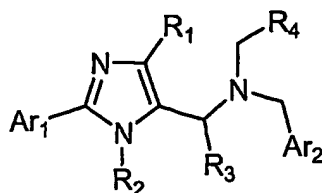
R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Additional preferred compounds of the above formula II include those compounds of the following formula:



wherein:

Ar<sub>1</sub> is phenyl, phenylalkyl, thienyl, imidazolyl, pyridyl, pyrimidyl, benzodioxinyl, benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 4;

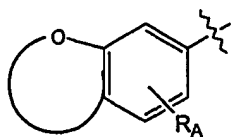
R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl; and

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

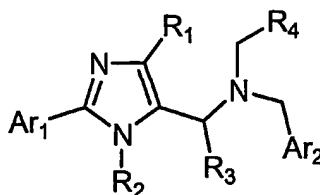
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.



Additional preferred compounds of the above formula II include those compounds of the following formula:



wherein:

Ar<sub>1</sub> is phenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in formula II;

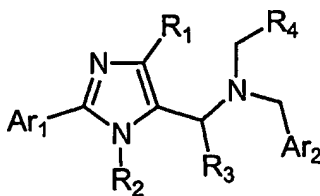
R<sub>1</sub> is hydrogen, methyl, ethyl, or optionally substituted phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Additional preferred compounds of the above formula II include those of the following formula:



wherein:

Ar<sub>1</sub> is phenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 4;

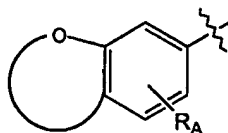
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

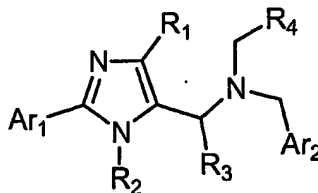
R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Still additional preferred compounds of the above formula Ii include of the following formula:

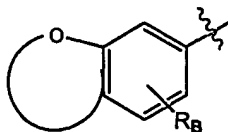


wherein:

Ar<sub>1</sub> is phenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl; or

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

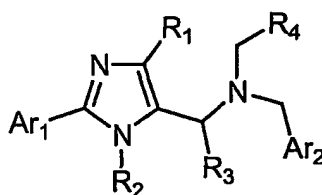
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Still further preferred compounds of the above formula II include those of the following formula:

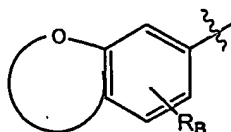


wherein:

Ar<sub>1</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; or

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

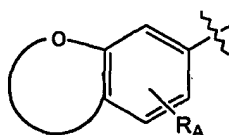
$R_1$  is hydrogen, methyl, ethyl, or phenyl;

$R_2$  is  $C_3$ - $C_8$  alkyl or  $C_3$ - $C_8$  cycloalkyl; and

$R_3$  is hydrogen or methyl; and

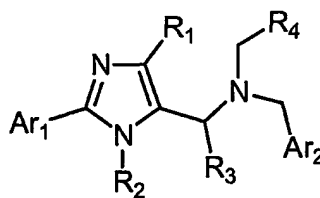
$R_4$  is phenyl, phenyl( $C_1$ - $C_4$ )alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino; or

$R_4$  is a bicyclic oxygen-containing group of the formula:



wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino.

Preferred compounds of the invention also include those of the following formula III:

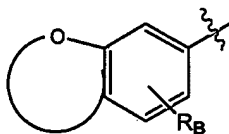


III

or a pharmaceutically acceptable salt thereof, wherein:

Ar<sub>1</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>1</sub> is selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>1</sub> is selected from

phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl,

pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> and R<sub>3</sub> are independently selected from

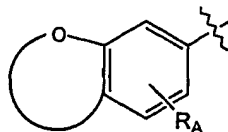
- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl,

N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Preferred compounds of the above formula III include those wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Additional preferred compounds of formula III include those wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.



Still additional preferred compounds of formula III above include those wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and

phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

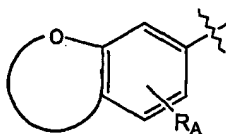
Preferred compounds of formula III above also include those wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

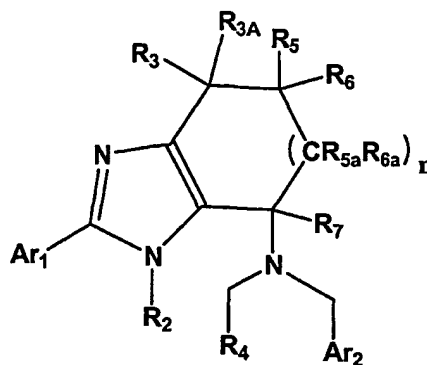
R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

The invention also includes compounds of the following formula IV:



IV

or a pharmaceutically acceptable salt thereof, wherein:

$n$  is an integer from 0 to 3; and

$R_2$  is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each or which may be substituted or unsubstituted;

$R_4$  is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be substituted or unsubstituted; or

$R_4$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaromatic or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms,

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or alkyl; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached form a cycloalkyl ring;

$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy, alkyl, and alkoxy;

$R_7$  represents hydrogen or alkyl;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

Also preferred are compounds of that formula IV above (such preferred compounds referred to as compounds of formula IV-A) wherein n, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>5a</sub>, R<sub>6a</sub>, and R<sub>7</sub> are as defined in that formula IV, and

R<sub>2</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each or which unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

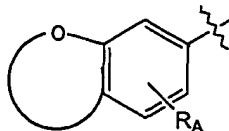
R<sub>4</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino and mono- or dialkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-

alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl and –  
 XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

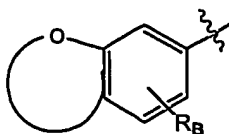


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl and –XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; and

- ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

X is independently selected at each occurrence from the group consisting of  $-\text{CH}_2-$ ,  $-\text{CHR}_C-$ ,  $-\text{O}-$ ,  $-\text{S}(\text{O})_m-$ ,  $-\text{NH}-$ ,  $-\text{NR}_C-$ ,  $-\text{C}(=\text{O})\text{NH}-$ ,  $-\text{C}(=\text{O})\text{NR}_C-$ ,  $-\text{S}(\text{O})_m\text{NH}-$ ,  $-\text{S}(\text{O})_m\text{NR}_C-$ ,  $-\text{NHC}(=\text{O})-$ ,  $-\text{NR}_C\text{C}(=\text{O})-$ ,  $-\text{NHS}(\text{O})_m-$ ,  $-\text{C}(=\text{O})\text{NHS}(\text{O})_m-$ , and  $-\text{NR}_C\text{S}(\text{O})_m-$  (where m is 0, 1, or 2); and

$\text{R}_B$  and  $\text{R}_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-\text{O}(\text{alkyl})$ ,  $-\text{NH}(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})(\text{alkyl})$ ,  $-\text{NHC}(\text{O})(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})\text{C}(\text{O})(\text{alkyl})$ ,  $-\text{NHS}(\text{O})_x(\text{alkyl})$ ,  $-\text{S}(\text{O})_x(\text{alkyl})$ ,  $-\text{S}(\text{O})_x\text{NH}(\text{alkyl})$ ,  $-\text{S}(\text{O})_x\text{N}(\text{alkyl})(\text{alkyl})$ , (where x is 0, 1, or 2).

Also preferred are compounds of formula IV above wherein (such preferred compounds referred to as compounds of formula IV-B)

n is defined as in formula IV above, and

$\text{R}_3$  and  $\text{R}_{3A}$  are the same or different and represent hydrogen or  $\text{C}_1\text{-C}_6$  alkyl; or

$\text{R}_3$  and  $\text{R}_{3A}$ , taken together with the carbon atom to which they are attached, form a  $\text{C}_{3-8}$  cycloalkyl ring;

$\text{R}_5$  and  $\text{R}_6$  are the same or different and represent hydrogen, halogen, hydroxy,  $\text{C}_1\text{-C}_6$  alkyl, or  $\text{C}_1\text{-C}_6$  alkoxy; or

$\text{R}_5$  and  $\text{R}_6$ , taken together with the carbon atom to which they are attached form a  $\text{C}_{3-8}$  cycloalkyl ring;

$\text{R}_{5a}$  and  $\text{R}_{6b}$  are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy,  $\text{C}_1\text{-C}_6$  alkyl, and  $\text{C}_1\text{-C}_6$  alkoxy;

$\text{R}_2$  is hydrogen or

$\text{C}_{1-8}$  alkyl,  $\text{C}_{2-8}$  alkenyl,  $\text{C}_{2-8}$  alkynyl,  $\text{C}_{3-8}$  cycloalkyl,  $(\text{C}_{3-8}$  cycloalkyl)  $\text{C}_{1-3}$  alkyl, or  $\text{C}_1\text{-C}_6$  haloalkyl, each or which unsubstituted or substituted by one or more of

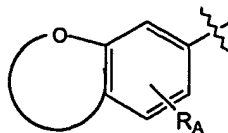
halogen, nitro, cyano, trifluormethyl, trifluoromethoxy, C<sub>1-3</sub> haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1-6</sub>)alkylamino;

R<sub>4</sub> is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> alkoxy, amino and mono- or di(C<sub>1-6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> alkoxy, amino, mono- or di(C<sub>1-6</sub>)alkylamino, amino(C<sub>1-6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1-6</sub>)alkylaminocarbonyl, N-(C<sub>1-6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

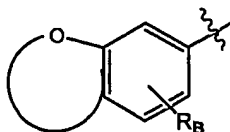
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> alkoxy, amino, and mono- or di(C<sub>1-6</sub>)alkylamino;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; and
- ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHR<sub>C</sub>-, -O-, -S(O)<sub>m</sub>-, -NH-, -NR<sub>C</sub>-, -C(=O)NH-, -C(=O)NR<sub>C</sub>-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NR<sub>C</sub>-, -NHC(=O)-, -NR<sub>C</sub>C(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NR<sub>C</sub>S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or

substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl),  
 -N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub>  
 alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -  
 S(O)<sub>x</sub>NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), (where x is  
 0, 1, or 2).

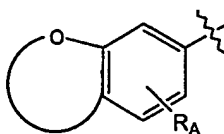
Also preferred are compounds of formula IV above (such preferred referred to as compounds of formula IV-C) wherein n, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>5a</sub>, R<sub>6a</sub>, and R<sub>7</sub> are as defined in formula IV above,

R<sub>4</sub> is hydrogen or

C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)  
 C<sub>1</sub>-C<sub>4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted  
 with one or more substituents selected from halogen, nitro, cyano,  
 trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl,  
 C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-  
 C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl,  
 benzodioxanyl, indolyl, each of which may be optionally substituted or  
 substituted with up to four groups independently selected from halogen,  
 nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  
 C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or  
 di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic  
 acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-  
 C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidyl, 1-pyrrolidinyl, 1-piperidyl, -  
 XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:





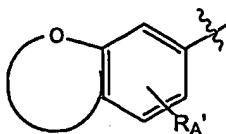
wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$Ar_1$  is phenyl, thienyl, or pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which is unsubstituted or substituted with up to four substituents independently selected from:

halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl,  $N$ -( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and  $-XR_B$ , wherein  $X$  and  $R_B$  are as defined below;

$Ar_2$  is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl,  $N$ -( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and  $-XR_B$ , wherein  $X$  and  $R_B$  are as defined below; or

$Ar_2$  is a bicyclic oxygen-containing group of the formula:



wherein  $R_A'$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,

C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHRC-, -O-, -S(O)<sub>m</sub>-, -NH-, -NRC-, -C(=O)NH-, -C(=O)NRC-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NRC-, -NHC(=O)-, -NRC(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NRC(S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), (where x is 0, 1, or 2).

Further preferred are compounds of the above formula IV-C wherein:

R<sub>3</sub> and R<sub>4</sub> are the same or different and represent hydrogen or methyl;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen or methyl; and

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently selected at each occurrence from hydrogen and methyl.

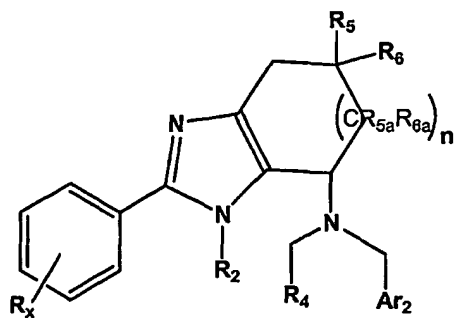
Further preferred are compounds of the above formula IV-C wherein:

R<sub>3</sub> and R<sub>4</sub> are hydrogen;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen or methyl; and

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently selected at each occurrence from hydrogen and methyl.

Further preferred are compounds of the above formula IV-C wherein:



or a pharmaceutically acceptable salt thereof, wherein:

n is an integer from 0 to 3; and

R<sub>2</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each or which may be substituted or unsubstituted;

R<sub>4</sub> is hydrogen or

C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl,

benzodioxanyl, indolyl, each of which may be optionally substituted or

substituted with up to four groups independently selected from halogen,

nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,

C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or

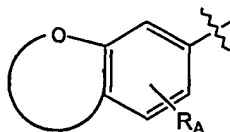
di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic

acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-

C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -

XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

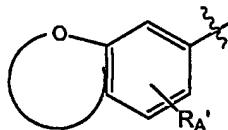
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$Ar_2$  is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl, N-( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and - $XR_B$ , wherein X and  $R_B$  are as defined below; or

$Ar_2$  is a bicyclic oxygen-containing group of the formula:



wherein  $R_A'$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

X is independently selected at each occurrence from the group consisting of  $-CH_2-$ ,  $-CHR_C-$ ,  $-O-$ ,  $-S(O)_m-$ ,  $-NH-$ ,  $-NR_C-$ ,  $-C(=O)NH-$ ,  $-C(=O)NR_C-$ ,  $-S(O)_mNH-$ ,  $-S(O)_mNR_C-$ ,  $-NHC(=O)-$ ,  $-NR_CC(=O)-$ ,  $-NHS(O)_m-$ ,  $-C(=O)NHS(O)_m-$ , and  $-NR_CS(O)_m-$  (where m is 0, 1, or 2); and

$R_B$  and  $R_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

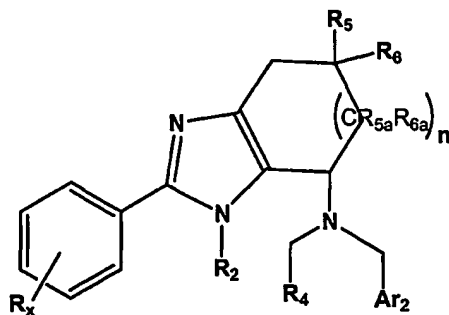
oxo, hydroxy,  $-O(C_1-C_6 \text{ alkyl})$ ,  $-NH(C_1-C_6 \text{ alkyl})$ ,  
 $-N(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ ,  $-NHC(O)(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})C(O)(C_1-C_6 \text{ alkyl})$ ,  $-NHS(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xNH(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xN(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ , (where  $x$  is 0, 1, or 2).

$R_5$  and  $R_6$  are the same or different and represent hydrogen or methyl;

$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently chosen at each occurrence from hydrogen and methyl; and

$R_x$  represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1-C_6$  alkyl,  $C_2-C_6$  alkenyl,  $C_2-C_6$  alkynyl,  $C_1-C_6$  alkoxy, amino, mono- or di( $C_1-C_6$ )alkylamino, and amino( $C_1-C_6$ )alkoxy.

Further preferred are compounds of the above formula IV-C wherein:



or a pharmaceutically acceptable salt thereof, wherein:

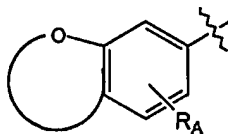
$n$  is an integer from 0 to 3; and

$R_4$  is hydrogen or

C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

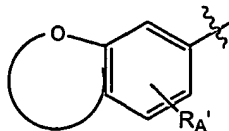


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-

C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidy, and –  
X<sub>R<sub>B</sub></sub>, wherein X and R<sub>B</sub> are as defined below; or

Ar<sub>2</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub>' represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHR<sub>C</sub>-, -O-, -S(O)<sub>m</sub>-, -NH-, -NR<sub>C</sub>-, -C(=O)NH-, -C(=O)NR<sub>C</sub>-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NR<sub>C</sub>-, -NHC(=O)-, -NR<sub>C</sub>C(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NR<sub>C</sub>S(O)<sub>m</sub>- (where m is 0, 1, or 2);  
and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), (where x is 0, 1, or 2).

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen or methyl;

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently chosen at each occurrence from hydrogen and methyl; and

R<sub>x</sub> represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy.

Further preferred are compounds of the above formula IV-C wherein:

Ar<sub>2</sub>, R<sub>x</sub>, and n are as defined in formula IV-C,

or a pharmaceutically acceptable salt thereof, wherein:

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl.

Further preferred are compounds of the above formula IV-C,

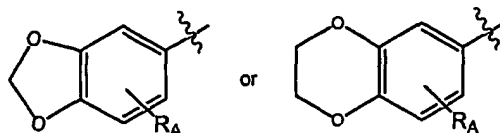
or a pharmaceutically acceptable salt thereof, wherein:

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>4</sub> is phenyl, which may be unsubstituted or substituted with:

C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl)C<sub>1</sub>-C<sub>4</sub> alkyl, haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen containing group of the formula:



wherein R<sub>A</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>4</sub> alkyl, haloalkyl, alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

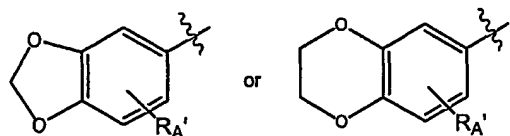
Ar<sub>2</sub> is phenyl which is unsubstituted or optionally substituted or substituted with up to four groups independently selected from:

halogen, C<sub>1</sub>-C<sub>7</sub> alkyl, C<sub>1</sub>-C<sub>7</sub> alkoxy, cyano, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-



alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, 1-morpholino, nitro, hydroxy, acetoxy, trifluoromethyl, and trifluoromethoxy or  $-XR_B$ , wherein X and  $R_B$  are as defined for formula IV-C; or

$Ar_2$  is a bicyclic oxygen-containing group of the formula:



wherein  $R_A$ ,  $R_A'$ , and n are as defined in formula IV-C.

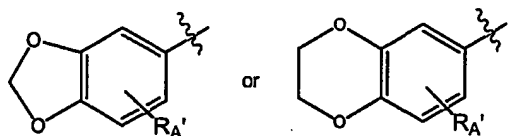
Also preferred are compounds of formula IV-C as specified above, wherein:

n is an integer from 0 to 3;

$R_2$  is  $C_3$ - $C_8$  straight or branched chain alkyl,  $C_2$ - $C_8$  alkenyl, or  $C_2$ - $C_8$  alkynyl;

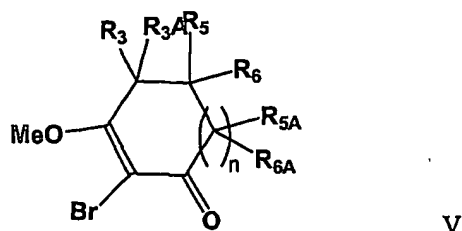
$R_4$  is  $C_1$ - $C_8$  straight or branched chain alkyl,  $C_2$ - $C_8$  alkenyl, or  $C_2$ - $C_8$  alkynyl;

$Ar_2$  is a bicyclic oxygen containing group of the formula:



wherein  $R_A'$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino.

Additional preferred compounds include those of the following formula V:



wherein:

$n$  is an integer from 0 to 3;

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached form a cycloalkyl ring; and

$R_{5A}$  and  $R_{6A}$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy.

Preferred compounds of formula V include those compounds wherein:

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or  $C_1$ - $C_6$  alkyl; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring of from three to six carbon atoms;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy,  $C_1$ - $C_6$  alkyl, or  $C_1$ - $C_6$  alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached form a cycloalkyl ring of from three to six carbon atoms; and

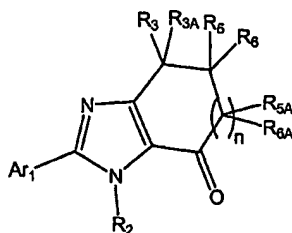
$R_{5A}$  and  $R_{6A}$  are the same or different and represent hydrogen, halogen, hydroxy,  $C_1$ - $C_6$  alkyl, or  $C_1$ - $C_6$  alkoxy.

Preferred compounds of formula V include those compounds wherein:

R<sub>3</sub> and R<sub>4</sub> are hydrogen; and

R<sub>5</sub>, R<sub>6</sub>, R<sub>5A</sub>, and R<sub>6A</sub> are the same or different and represent hydrogen or methyl.

The invention also includes compounds of the following formula VI:



VI

wherein:

n is an integer from 0 to 3;

R<sub>2</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each of which may be substituted or unsubstituted;

R<sub>3</sub> and R<sub>4</sub> are the same or different and represent hydrogen or alkyl; or

R<sub>3</sub> and R<sub>3A</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

R<sub>5A</sub> and R<sub>6A</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; and

Ar<sub>1</sub> is unsubstituted or substituted carbocyclic aryl, unsubstituted or substituted arylalkyl, or a unsubstituted or substituted heteroaromatic or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

Preferred compounds of formula VI include those compounds wherein:

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, C<sub>2</sub>-C<sub>8</sub> (cycloalkyl)C<sub>1</sub>-C<sub>4</sub> alkyl, or C<sub>1</sub>-C<sub>8</sub> haloalkyl;

R<sub>3</sub> and R<sub>3a</sub> are the same or different and represent hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl; or

R<sub>3</sub> and R<sub>3a</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring of from three to six carbon atoms; and

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a cycloalkyl ring of from three to six carbon atoms;

R<sub>5A</sub> and R<sub>6A</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy;

Ar<sub>1</sub> is phenyl, thienyl, or pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which is unsubstituted or substituted with up to four substituents independently selected from:

halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below;

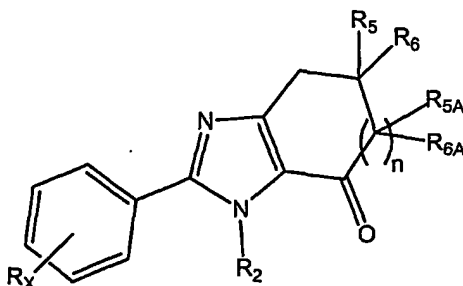
X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHRC-, -O-, -S(O)<sub>m</sub>-, -NH-, -NR<sub>C</sub>-, -C(=O)NH-, -C(=O)NR<sub>C</sub>-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NR<sub>C</sub>-, -NHC(=O)-, -NR<sub>C</sub>C(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NR<sub>C</sub>S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:  
hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl),

-N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), (where x is 0, 1, or 2).

Preferred compounds of the above formula VI include those of the following formula:



wherein:

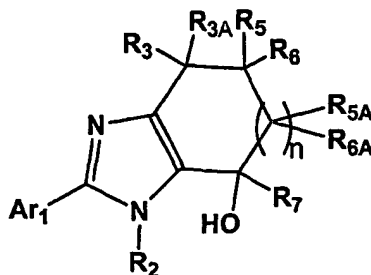
n is 0, 1, or 2:

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>5</sub>, R<sub>6</sub>, R<sub>5A</sub>, and R<sub>6A</sub> are the same or different and represent hydrogen or methyl; and

R<sub>X</sub> represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy.

The invention also includes compounds of the following formula VII:



VII

wherein:

$n$  is an integer from 0 to 3; and

$R_2$  is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be substituted or unsubstituted;

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or alkyl; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen or alkyl; or

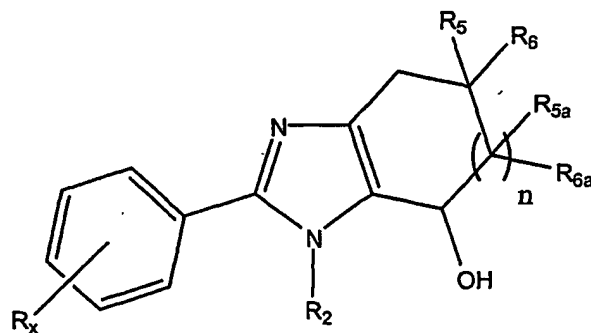
$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_{5A}$  and  $R_{6A}$  are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy, alkyl, and alkoxy;

$R_7$  represents hydrogen or alkyl; and

$Ar_1$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

Preferred compounds of formula VII include those of the following formula:



wherein:

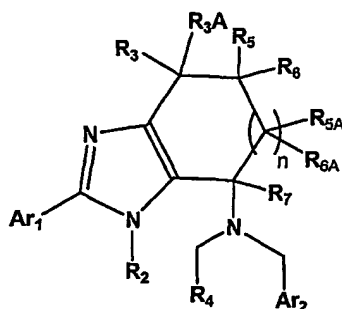
$n$  is an integer from 0 to 3;

$R_2$  is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

$R_5$ ,  $R_6$ ,  $R_{5A}$ , and  $R_{6A}$  are the same or different and represent hydrogen or methyl; and

R<sub>x</sub> represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy.

The invention also includes methods of synthesis of compounds of the invention. In particular, the invention includes methods to synthesis compounds of the following formula VIII:



VIII

wherein:

n is an integer from 0 to 3; and

R<sub>2</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each or which may be substituted or unsubstituted;

R<sub>4</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be substituted or unsubstituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaromatic or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms,

R<sub>3</sub> and R<sub>3A</sub> are the same or different and represent hydrogen or alkyl; or

R<sub>3</sub> and R<sub>3A</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached form a cycloalkyl ring;

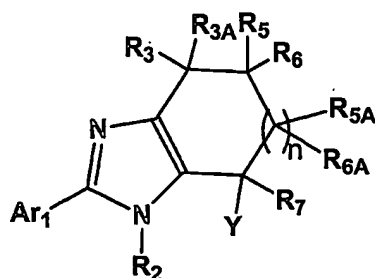
$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy, alkyl, and alkoxy;

$R_7$  represents hydrogen or alkyl;

$Ar_1$  and  $Ar_2$  are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

the process comprising:

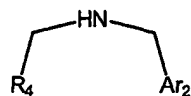
reacting a compound of the formula:



wherein Y is halogen or sulfonate ester,

in a suitable solvent in the presence of a suitable base,

with a secondary amine of the formula:



In that synthetic method, preferred are compounds (referred to as compounds of formula VIII-A) wherein

$n$  and Y are as defined above for formula VIII;

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or  $C_1$ - $C_6$  alkyl; or



R<sub>3</sub> and R<sub>3A</sub>, taken together with the carbon atom to which they are attached, form a C<sub>3-8</sub> cycloalkyl ring;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a C<sub>3-8</sub> cycloalkyl ring;

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, and C<sub>1</sub>-C<sub>6</sub> alkoxy;

R<sub>2</sub> is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub> cycloalkyl, (C<sub>3-8</sub> cycloalkyl) C<sub>1-3</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> haloalkyl, each or which unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, C<sub>1-3</sub> haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

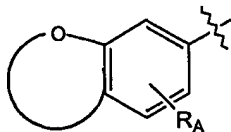
R<sub>4</sub> is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub> cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of

C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

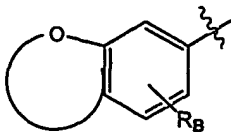


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; and

- ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano,

C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> alkoxy, amino, and mono- or di(C<sub>1-6</sub> alkylamino);

X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHRC-, -O-, -S(O)<sub>m</sub>-, -NH-, -NRC-, -C(=O)NH-, -C(=O)NRC-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NRC-, -NHC(=O)-, -NRC(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NRC(S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

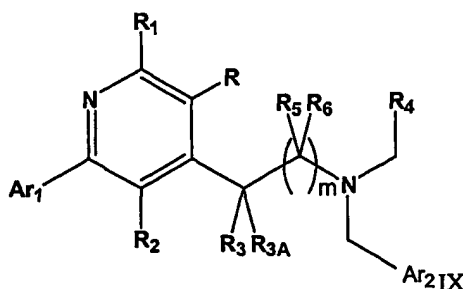
R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1-6</sub> alkyl), -NH(C<sub>1-6</sub> alkyl), -N(C<sub>1-6</sub> alkyl)(C<sub>1-6</sub> alkyl), -NHC(O)(C<sub>1-6</sub> alkyl), -N(C<sub>1-6</sub> alkyl)C(O)(C<sub>1-6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1-6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1-6</sub> alkyl), -S(O)<sub>x</sub>NH(C<sub>1-6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1-6</sub> alkyl)(C<sub>1-6</sub> alkyl), (where x is 0, 1, or 2).

The invention also includes compounds of the above formula VIII and VIII-A, and pharmaceutically acceptable salts of such compounds.

The invention also provides compounds of the following formula IX:



or a pharmaceutically acceptable salt thereof, wherein:

m is 0, 1, or 2;

R is hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or

optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl; or

R is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

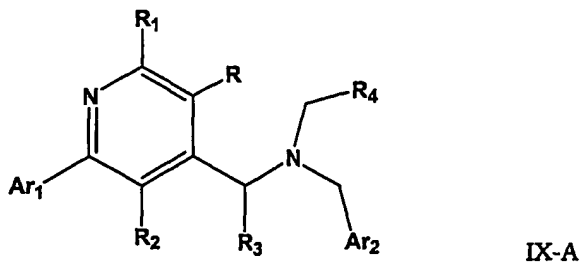
R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

Preferred compounds of formula IX include those of the following formula IX-

A:



wherein Ar<sub>1</sub>, Ar<sub>2</sub>, R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are for formula IX above.

Preferred compounds of formula IX-A above include those wherein:

i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and

ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino; or

R is selected from

phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino; and

R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are independently selected from

i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and

ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

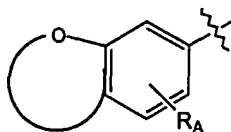
R<sub>4</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino and mono- or dialkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl,

benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl,  $-XR_B$ , wherein X and  $R_B$  are as defined below; or

$R_4$  is a bicyclic oxygen-containing group of the formula:

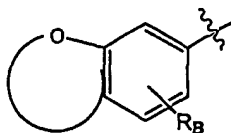


wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

$Ar_1$  and  $Ar_2$  are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and -

ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

X is independently selected at each occurrence from the group consisting of  $-\text{CH}_2-$ ,  $-\text{CHR}_C-$ ,  $-\text{O}-$ ,  $-\text{S}(\text{O})_m-$ ,  $-\text{NH}-$ ,  $-\text{NR}_C-$ ,  $-\text{C}(=\text{O})\text{NH}-$ ,  $-\text{C}(=\text{O})\text{NR}_C-$ ,  $-\text{S}(\text{O})_m\text{NH}-$ ,  $-\text{S}(\text{O})_m\text{NR}_C-$ ,  $-\text{NHC}(=\text{O})-$ ,  $-\text{NR}_C\text{C}(=\text{O})-$ ,  $-\text{NHS}(\text{O})_m-$ ,  $-\text{C}(=\text{O})\text{NHS}(\text{O})_m-$ , and  $-\text{NR}_C\text{S}(\text{O})_m-$  (where m is 0, 1, or 2); and

$R_B$  and  $R_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-\text{O}(\text{alkyl})$ ,  $-\text{NH}(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})(\text{alkyl})$ ,  $-\text{NHC}(\text{O})(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})\text{C}(\text{O})(\text{alkyl})$ ,  $-\text{NHS}(\text{O})_x(\text{C}_1-\text{C}_6\text{alkyl})$ ,  $-\text{S}(\text{O})_x(\text{alkyl})$ ,  $-\text{S}(\text{O})_x\text{NH}(\text{alkyl})$ ,  $-\text{S}(\text{O})_x\text{N}(\text{alkyl})(\text{alkyl})$ , (where x is 0, 1, or 2).

Additional preferred compounds of formula IX-A include those wherein:

$R_1$ ,  $R_2$ , and  $R_3$  are independently selected from

- i) hydrogen, halogen, hydroxy, amino,  $\text{C}_1-\text{C}_6$  alkoxy, mono- or di( $\text{C}_1-\text{C}_6$ )alkylamino, cyano, nitro, haloalkyl, and
- ii)  $\text{C}_1-\text{C}_8$  alkyl,  $\text{C}_2-\text{C}_6$  alkenyl,  $\text{C}_2-\text{C}_6$  alkynyl,  $\text{C}_3-\text{C}_8$  cycloalkyl, and ( $\text{C}_3-\text{C}_8$  cycloalkyl)  $\text{C}_1-\text{C}_3$  alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy,

haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R is selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R is selected from

phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>4</sub> is hydrogen or

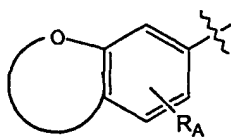
C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny,



substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

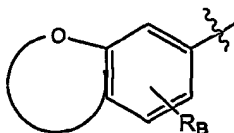
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; and



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$X$  is independently selected at each occurrence from the group consisting of  $-CH_2-$ ,  $-CHR_C-$ ,  $-O-$ ,  $-S(O)_m-$ ,  $-NH-$ ,  $-NR_C-$ ,  $-C(=O)NH-$ ,  $-C(=O)NR_C-$ ,  $-S(O)_mNH-$ ,  $-S(O)_mNR_C-$ ,  $-NHC(=O)-$ ,  $-NR_CC(=O)-$ ,  $-NHS(O)_m-$ ,  $-C(=O)NHS(O)_m-$ , and  $-NR_CS(O)_m-$  (where  $m$  is 0, 1, or 2); and

$R_B$  and  $R_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-O(C_1-C_6 \text{ alkyl})$ ,  $-NH(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ ,  $-NHC(O)(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})C(O)(C_1-C_6 \text{ alkyl})$ ,  $-NHS(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xNH(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xN(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ , (where  $x$  is 0, 1, or 2).

Additional preferred compounds of formula IX-A above include those wherein:

$R$  is hydrogen, halogen,  $C_1$ - $C_8$  alkyl,  $C_2$ - $C_8$  alkenyl,  $C_2$ - $C_8$  alkynyl,  $C_1$ - $C_8$  cycloalkyl,  $(C_3$ - $C_8$ cycloalkyl) $C_1$ - $C_3$ alkyl,  $C_1$ - $C_8$  alkoxy, or  $C_1$ - $C_8$  haloalkyl, or

$R$  is a phenyl which may be substituted by up to five substituents independently chosen from  $C_1$ - $C_8$  alkyl,  $C_2$ - $C_8$  alkenyl,  $C_2$ - $C_8$  alkynyl,  $C_1$ - $C_8$  alkoxy, halogen, cyano, carboxylic acid, hydroxy, acetoxy, nitro, amino, mono or di( $C_1$ -

C<sub>6</sub>)alkylamino, aminocarbonyl, sulfonamido, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido, 3,4-methylenedioxy, 3,4-(1,2-ethylene)dioxy, trifluoromethyl or trifluoromethoxy;

R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)C<sub>1</sub>-C<sub>3</sub>alkyl or C<sub>1</sub>-C<sub>8</sub> haloalkyl;

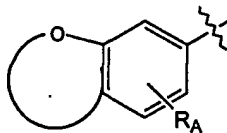
R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>8</sub> cycloalkyl or (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)C<sub>1</sub>-C<sub>3</sub>alkyl or C<sub>1</sub>-C<sub>8</sub> haloalkyl;

R<sub>3</sub> is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

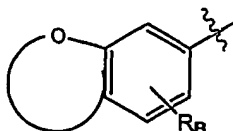


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxany, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny,

isoquinolinyl, and quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl, and

bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Still additional preferred compounds of formula IX-A include those compounds wherein:

R is hydrogen, halogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)C<sub>1</sub>-C<sub>3</sub>alkyl, C<sub>1</sub>-C<sub>8</sub> alkoxy, or C<sub>1</sub>-C<sub>8</sub> haloalkyl, or

R is a phenyl which may be substituted by up to five substituents independently chosen from C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>8</sub> alkoxy, halogen, cyano, carboxylic acid, hydroxy, acetoxy, nitro, amino, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, aminocarbonyl, sulfonamido, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido, 3,4-methylenedioxy, 3,4-(1,2-ethylene)dioxy, trifluoromethyl or trifluoromethoxy;

R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)C<sub>1</sub>-C<sub>3</sub>alkyl or C<sub>1</sub>-C<sub>8</sub> haloalkyl;

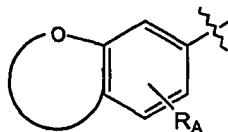
R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>8</sub> cycloalkyl or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl)C<sub>1</sub>-C<sub>3</sub>alkyl or C<sub>1</sub>-C<sub>8</sub> haloalkyl;

R<sub>3</sub> is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



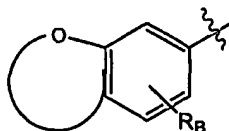
wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>1</sub> is phenyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl,

trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl, or

Ar<sub>2</sub> is a bicyclic oxygen-containing group of the formula:

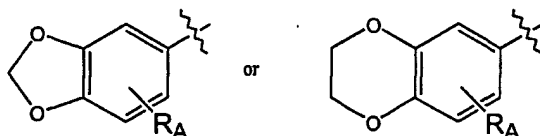


wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Still further preferred compounds of formula IX above include those wherein R is hydrogen, halogen, methyl, ethyl, methoxy, ethoxy, trifluoromethyl, or phenyl; R<sub>1</sub> is hydrogen, methyl or ethyl; R<sub>2</sub> is C<sub>3</sub>-C<sub>6</sub> alkyl; R<sub>3</sub> is hydrogen, methyl or ethyl; R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl,

trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

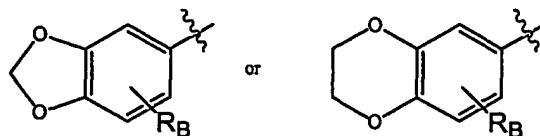


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>1</sub> is phenyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

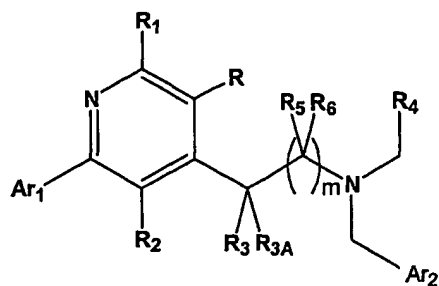
Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

The invention also include compounds of the following formula X:



X

wherein:

m is 0, 1, or 2;

R is hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl; or

R is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

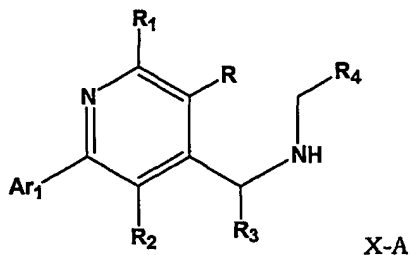
R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.



Preferred compounds of formula X include those of the following formula X-

A:



wherein Ar<sub>1</sub>, R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> are as defined for formula X above.

Additional preferred compounds of formula X include those wherein:

R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are independently selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R is selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R is selected from

phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with

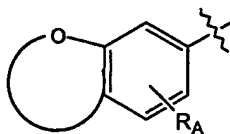
up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>4</sub> is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>8</sub>, wherein X and R<sub>8</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

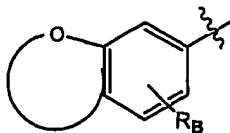


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl,

C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; and
- ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

X is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHRC-, -O-, -S(O)<sub>m</sub>-, -NH-, -NRC-, -C(=O)NH-, -C(=O)NRC-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NRC-, -NHC(=O)-, -NRC(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NRC(S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl),  
 -N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -  
 NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>N(C<sub>1</sub>-C<sub>6</sub>  
 alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), (where x is 0, 1, or 2).

Additional preferred compounds of formula X above include those wherein:

R is hydrogen, halogen, methyl, ethyl, methoxy, ethoxy, trifluoromethyl, or phenyl;

R<sub>1</sub> is hydrogen, methyl or ethyl;

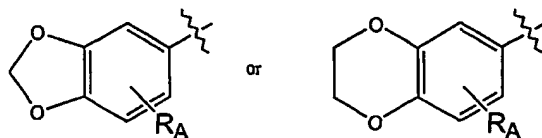
R<sub>2</sub> is C<sub>3</sub>-C<sub>6</sub> alkyl;

R<sub>3</sub> is hydrogen, methyl or ethyl;

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

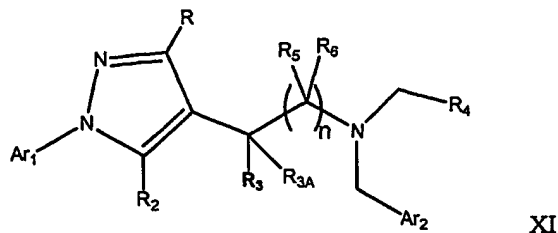
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino; and

$Ar_1$  is phenyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino.

The invention also includes compounds of the following formula XI:



XI

or pharmaceutically acceptable salt thereof, wherein:

$n$  is 0, 1, or 2;

$R$  is chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl, optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

$R_2$ ,  $R_3$ ,  $R_{3A}$ ,  $R_5$ , and  $R_6$  are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally

substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

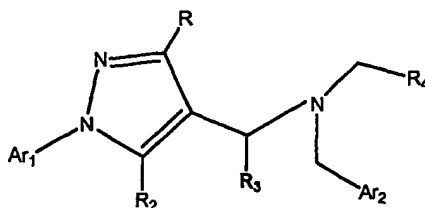
R and R<sub>3</sub> may be joined to form an optionally substituted saturated carbocyclic ring of from 5 to 8 members or an optionally substituted heterocyclic ring of from 5 to 8 members;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

The invention further includes compounds of the following formula XII:



XII

or a pharmaceutically acceptable salt thereof, wherein:

R is chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl, optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>2</sub> and R<sub>3</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

R and R<sub>3</sub> may be joined to form an optionally substituted carbocyclic ring of from 5 to 8 members or an optionally substituted heterocyclic ring of from 5 to 8 members;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

Preferred compounds of formula XII above include wherein R and R<sub>3</sub> are not joined.

Also preferred are compounds of formula XII wherein:

R is selected from

- i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and
- ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino,
- iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl,

pyrimidyl, pyrazinyl, each of which may be substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

R<sub>2</sub> and R<sub>3</sub> are independently selected from

- i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and
- ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

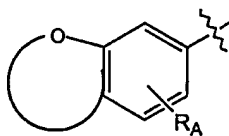
R<sub>4</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino and mono- or dialkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or



R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

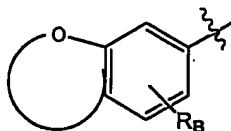


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl and -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below;, and

- ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

X is independently selected at each occurrence from the group consisting of  $-\text{CH}_2-$ ,  $-\text{CHR}_\text{C}-$ ,  $-\text{O}-$ ,  $-\text{S}(\text{O})_\text{m}-$ ,  $-\text{NH}-$ ,  $-\text{NR}_\text{C}-$ ,  $-\text{C}(=\text{O})\text{NH}-$ ,  $-\text{C}(=\text{O})\text{NR}_\text{C}-$ ,  $-\text{S}(\text{O})_\text{m}\text{NH}-$ ,  $-\text{S}(\text{O})_\text{m}\text{NR}_\text{C}-$ ,  $-\text{NHC}(=\text{O})-$ ,  $-\text{NR}_\text{C}\text{C}(=\text{O})-$ ,  $-\text{NHS}(\text{O})_\text{m}-$ ,  $-\text{C}(=\text{O})\text{NHS}(\text{O})_\text{m}-$ , and  $-\text{NR}_\text{C}\text{S}(\text{O})_\text{m}-$  (where m is 0, 1, or 2); and

$\text{R}_\text{B}$  and  $\text{R}_\text{C}$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-\text{O}(\text{alkyl})$ ,  $-\text{NH}(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})(\text{alkyl})$ ,  $-\text{NHC}(\text{O})(\text{alkyl})$ ,  $-\text{N}(\text{alkyl})\text{C}(\text{O})(\text{alkyl})$ ,  $-\text{NHS}(\text{O})_\text{x}(\text{alkyl})$ ,  $-\text{S}(\text{O})_\text{x}(\text{alkyl})$ ,  $-\text{S}(\text{O})_\text{x}\text{NH}(\text{alkyl})$ ,  $-\text{S}(\text{O})_\text{x}\text{N}(\text{alkyl})(\text{alkyl})$ , (where x is 0, 1, or 2).

Additional preferred compounds of formula XII include those wherein:

R is selected from

- i) hydrogen, halogen, hydroxy, amino,  $\text{C}_1$ - $\text{C}_6$  alkoxy, mono- or di( $\text{C}_1$ - $\text{C}_6$ )alkylamino, cyano, nitro, haloalkyl, and
- ii)  $\text{C}_1$ - $\text{C}_8$  alkyl,  $\text{C}_2$ - $\text{C}_6$  alkenyl,  $\text{C}_2$ - $\text{C}_6$  alkynyl,  $\text{C}_3$ - $\text{C}_8$  cycloalkyl, and ( $\text{C}_3$ - $\text{C}_8$ )cycloalkyl  $\text{C}_1$ - $\text{C}_3$  alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di( $\text{C}_1$ - $\text{C}_6$ )alkylamino,
- iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $\text{C}_1$ - $\text{C}_8$  alkyl,  $\text{C}_2$ - $\text{C}_6$  alkenyl,  $\text{C}_2$ - $\text{C}_6$  alkynyl,  $\text{C}_1$ - $\text{C}_6$  alkoxy, amino, and mono- or di( $\text{C}_1$ - $\text{C}_6$ )alkylamino;

R<sub>2</sub> and R<sub>3</sub> are independently selected from

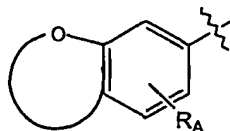
- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>4</sub> is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -XR<sub>B</sub>, wherein X and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

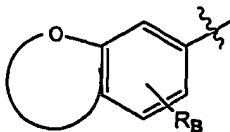


wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$Ar_1$  and  $Ar_2$  are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl, N-( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, and  $-XR_B$ , wherein X and  $R_B$  are as defined below; and

- ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

X is independently selected at each occurrence from the group consisting of  $-\text{CH}_2-$ ,  $-\text{CHRC}-$ ,  $-\text{O}-$ ,  $-\text{S(O)}_m-$ ,  $-\text{NH}-$ ,  $-\text{NR}_C-$ ,  $-\text{C(=O)NH}-$ ,  $-\text{C(=O)NR}_C-$ ,  $-\text{S(O)}_m\text{NH}-$ ,  $-\text{S(O)}_m\text{NR}_C-$ ,  $-\text{NHC(=O)}-$ ,  $-\text{NR}_C\text{C(=O)}-$ ,  $-\text{NHS(O)}_m-$ ,  $-\text{C(=O)NHS(O)}_m-$ , and  $-\text{NR}_C\text{S(O)}_m-$  (where m is 0, 1, or 2); and

$\text{R}_B$  and  $\text{R}_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-\text{O}(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{NH}(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{N}(\text{C}_1\text{-C}_6 \text{ alkyl})(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{NHC(O)}(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{N}(\text{C}_1\text{-C}_6 \text{ alkyl})\text{C(O)}(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{NHS(O)}_x(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{S(O)}_x(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{S(O)}_x\text{NH}(\text{C}_1\text{-C}_6 \text{ alkyl})$ ,  $-\text{S(O)}_x\text{N}(\text{C}_1\text{-C}_6 \text{ alkyl})(\text{C}_1\text{-C}_6 \text{ alkyl})$ , (where x is 0, 1, or 2).

Also preferred are compounds of formula XII wherein:

R is hydrogen, halogen, hydroxy,  $\text{C}_1\text{-C}_6$  alkoxy, haloalkyl,  $\text{C}_1\text{-C}_8$  alkyl,  $\text{C}_2\text{-C}_6$  alkenyl,  $\text{C}_2\text{-C}_6$  alkynyl,  $\text{C}_3\text{-C}_8$  cycloalkyl, and  $(\text{C}_3\text{-C}_8)\text{cycloalkyl}$   $\text{C}_1\text{-C}_3$  alkyl, or

R is phenyl substituted with up to five groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $\text{C}_1\text{-C}_8$  alkyl,  $\text{C}_2\text{-C}_6$  alkenyl,  $\text{C}_2\text{-C}_6$  alkynyl,  $\text{C}_1\text{-C}_6$  alkoxy, amino, and mono- or di( $\text{C}_1\text{-C}_6$ )alkylamino, aminocarbonyl, sulfonamido, mono or di( $\text{C}_1\text{-C}_6$ )alkylsulfonamido, 3,4-methylenedioxy, and 3,4-(1,2-ethylene)dioxy;

$\text{R}_2$  is selected from  $\text{C}_1\text{-C}_8$  alkyl,  $\text{C}_2\text{-C}_6$  alkenyl,  $\text{C}_2\text{-C}_6$  alkynyl,  $\text{C}_3\text{-C}_8$  cycloalkyl,  $(\text{C}_3\text{-C}_8)\text{cycloalkyl}$   $\text{C}_1\text{-C}_3$  alkyl and haloalkyl;

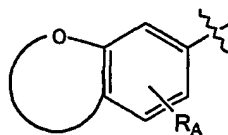
$\text{R}_3$  is hydrogen  $\text{C}_1\text{-C}_8$  alkyl,  $\text{C}_2\text{-C}_6$  alkenyl,  $\text{C}_2\text{-C}_6$  alkynyl;

$\text{R}_4$  is  $\text{C}_{1-8}$  alkyl,  $\text{C}_{2-8}$  alkenyl,  $\text{C}_{2-8}$  alkynyl,  $\text{C}_{3-8}\text{cycloalkyl}$ ,  $(\text{C}_{3-8}\text{cycloalkyl})\text{C}_{1-4}\text{alkyl}$ , haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl,

trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, each of which may be substituted with up to five groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl,

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

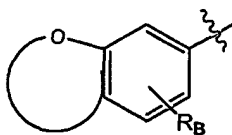


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

i) phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, and benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl; or

ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_8$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino.

Also preferred are compounds of formula XII wherein:

$R$ ,  $R_2$ ,  $R_3$ ,  $R_4$ , and  $Ar_2$  are as defined in formula XII;

$Ar_1$  is phenyl with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, and amino( $C_1$ - $C_6$ )alkoxy.

Also preferred are compounds of formula XII wherein:

$R$ ,  $R_2$ , and  $R_3$  are as defined in formula XII;

$Ar_1$  is phenyl with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, and amino( $C_1$ - $C_6$ )alkoxy;

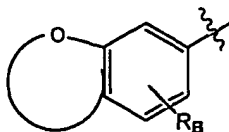
$R_4$  is  $C_3$ - $C_8$  alkyl,  $C_2$ - $C_8$  alkenyl,  $C_2$ - $C_8$  alkynyl,  $C_3$ - $C_8$  cycloalkyl, ( $C_3$ - $C_8$  cycloalkyl) $C_1$ - $C_4$  alkyl,  $C_1$ - $C_8$  haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino and mono- or di( $C_1$ - $C_6$ )alkylamino,

$R_4$  is phenyl, phenyl( $C_1$ - $C_4$ )alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, each of which

may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl;

Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, or benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl; or

Ar<sub>2</sub> is bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Also preferred are compounds of formula XII wherein:

R is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl C<sub>1</sub>-C<sub>3</sub> alkyl, or

R is phenyl substituted with up to five groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,



C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, aminocarbonyl, sulfonamido, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido, 3,4-methylenedioxy, and 3,4-(1,2-ethylene)dioxy;

R<sub>2</sub> is C<sub>3</sub>-C<sub>6</sub> alkyl;

R<sub>3</sub> is hydrogen, methyl, or ethyl;

R<sub>4</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>8</sub> haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

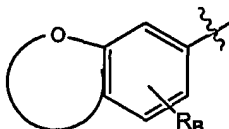
R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl;

Ar<sub>1</sub> is phenyl with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy;

Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, or benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl,

trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl; or

Ar<sub>2</sub> is bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Also preferred are compounds of formula XII wherein:

R is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl C<sub>1</sub>-C<sub>3</sub> alkyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>6</sub> alkyl;

R<sub>3</sub> is hydrogen, methyl, or ethyl;

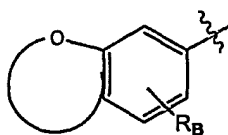
R<sub>4</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>8</sub> haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>1</sub> is phenyl with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy; and

Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl,

benzodioxanyl, benzodioxinyl, benzodioxolyl, or benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl; or

Ar<sub>2</sub> is bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Also preferred are compounds of formula XII wherein:

R is hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl C<sub>1</sub>-C<sub>3</sub> alkyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>6</sub> alkyl;

R<sub>3</sub> is hydrogen, methyl, or ethyl;

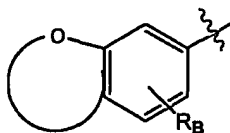
R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono

or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl;

Ar<sub>1</sub> is phenyl with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy;

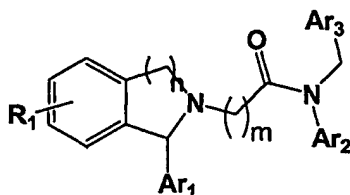
Ar<sub>2</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, chromanyl, dihydrobenzofuranyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, or benz[d]isoxazolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl; or

Ar<sub>2</sub> is bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

The invention also includes compounds of the following formula XIII:



XIII

or a pharmaceutically acceptable salt thereof, wherein:

n is 1, 2, or 3



represents a carbon chain that may be substituted with hydrogen, halogen, cyano, nitro amino, mono or dialkyl amino, alkenyl, alkynyl, alkoxy, trifluoromethyl, trifluoromethoxy, straight or branched chain alkyl, or cycloalkyl, and n is 1, 2, or 3;

Ar<sub>1</sub>, Ar<sub>2</sub>, and Ar<sub>3</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

R<sub>1</sub> represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, alkoxy, acetoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or dialkylaminocarbonyl, sulfonamido, and mono or dialkylsulfonamido.

Also preferred are compounds of formula XIII wherein

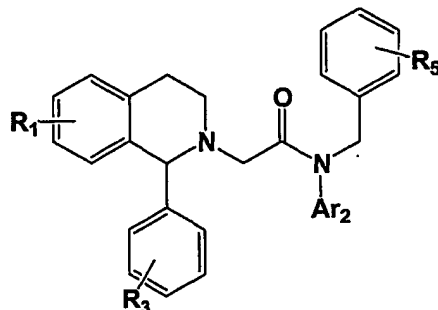
n, m, and R<sub>1</sub> are defined as for formula XIII above;

Ar<sub>1</sub> and Ar<sub>3</sub> are independently chosen from phenyl, pyridyl, and pyrimidinyl each of which is optionally optionally substituted or substituted with up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>3</sub>alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, 3,4-methylenedioxy, ethylenedioxy, and mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido; and

Ar<sub>2</sub> represents suberanyl, indanyl, tetrahydronaphtyl, or indolyl, each of which is optionally optionally substituted or substituted with up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl,

C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl)  
 C<sub>1</sub>-C<sub>3</sub>alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or  
 di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, 3,4-methylenedioxy,  
 ethylenedioxy, and mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido.

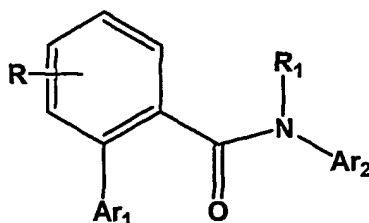
Also preferred are compounds of formula XIII above wherein:



R<sub>1</sub>, R<sub>3</sub>, and R<sub>5</sub> each represent up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>3</sub>alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, and mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido; and

represents suberanyl, indanyl, tetrahydronaphthyl, or indolyl, each of which is optionally optionally substituted or substituted with up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>3</sub>alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, 3,4-methylenedioxy, ethylenedioxy, and mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido.

The invention also includes compounds of the following formula XIV:



or a pharmaceutically acceptable salt, thereof, wherein:

R represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, alkoxy, acetoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, 3,4-methylenedioxy, ethylenedioxy, and mono or dialkylsulfonamido;

R<sub>1</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>1</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl, optionally substituted heteroarylalkyl, optionally substituted heteroarylalkyl, or an optionally substituted heteroalicyclic or heteroalicyclicalkyl group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl, optionally substituted heteroarylalkyl, or an optionally substituted heteroalicyclic or heteroalicyclicalkyl group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

Preferred compounds of formula XIV include those (referred to herein as compounds of formula XIV-A) wherein

R represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>),

mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, sulfonamido, 3,4-methylenedioxy, ethylenedioxy, and mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonamido;

R<sub>1</sub> is C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, or

R<sub>1</sub> is phenyl, phenylalkyl, chromanyl, chromanylalkyl, imidazolyl, imidazolylalkyl, pyridyl, pyridylalkyl, pyrimidyl, pyrimidylalkyl, pyrazinyl, pyrazinylalkyl, indolyl, indolylalkyl, indanyl, indanylalkyl, benzodioxolylalkyl, or benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl;

Ar<sub>1</sub> is chosen from phenyl, pyrrolyl, imidazolyl, pyrazolyl, triazolyl, thiophenyl, and pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, and N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl; and

Ar<sub>2</sub> is chosen from phenyl, phenylalkyl, chromanyl, chromanylalkyl, pyrrolyl, pyrrolylalkyl, furanyl, furanylalkyl, thienyl, thienylalkyl, pyridyl, pyridylalkyl, pyrimidyl, pyrimidylalkyl, pyrazinyl, pyrazinylalkyl, benzimidazolyl, benzimidazolylalkyl, imidazopyrdinyl, imidazopyrdinylalkyl, naphthyl, naphthylalkyl, indolyl, indolylalkyl, indanyl, indanylalkyl, benzofuranyl,



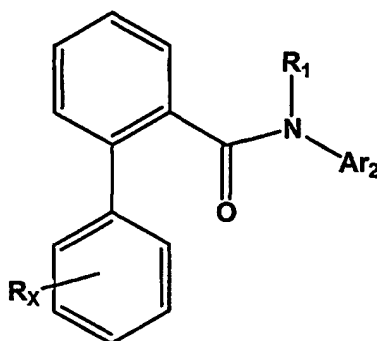
benzofuranylalkyl, benzodioxinyl, benzodioxinylalkyl, benzodioxolyl, benzodioxolylalkyl, quinolinyl, quinolinylalkyl, isoquinolinyl, isoquinolinylalkyl, each of which may be optionally substituted or substituted with up to four groups independently selected from:

halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino(C<sub>1</sub>-C<sub>6</sub>)alkyl, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, C<sub>1</sub>-C<sub>6</sub> alkoxyC<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxyC<sub>1</sub>-C<sub>6</sub> alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl,

benzyl (which may be unsubstituted or substituted with one or more substituents independently chosen from halogen, C<sub>1</sub>-C<sub>6</sub>alkyl, and C<sub>1</sub>-C<sub>6</sub>alkoxy),

-C<sub>1</sub>-C<sub>6</sub> alkylNR<sub>2</sub>R<sub>3</sub> or -C<sub>1</sub>-C<sub>6</sub>alkoxy NR<sub>2</sub>R<sub>3</sub> wherein the point of attachment to Ar<sub>2</sub> is at the C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>1</sub>-C<sub>6</sub> alkoxy, and R<sub>2</sub> and R<sub>3</sub> are hydrogen, or straight or branched chain alkyl and are optionally substituted with halogen, hydroxy, or C<sub>1</sub>-C<sub>6</sub> alkoxy and R<sub>2</sub> and R<sub>3</sub> may be taken together with the nitrogen to which they are attached to form a heterocycloalkyl group.

Preferred compounds of formula XIV-A include those wherein:



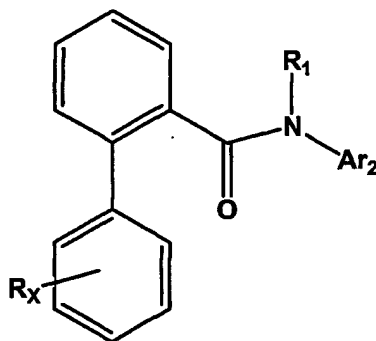
wherein:

Ar<sub>2</sub> is as defined in Claim in formula XIV-A;

R<sub>X</sub> represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, and C<sub>2</sub>-C<sub>6</sub> alkynyl; and

R<sub>1</sub> is C<sub>1</sub>-C<sub>6</sub>alkyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl)C<sub>1</sub>-C<sub>4</sub>alkyl, phenyl, phenylC<sub>1</sub>-C<sub>6</sub>alkyl, chromanyl, chromanylC<sub>1</sub>-C<sub>6</sub>alkyl, imidazolyl, imidazolylC<sub>1</sub>-C<sub>6</sub>alkyl, pyridyl, pyridylC<sub>1</sub>-C<sub>6</sub>alkyl, pyrimidyl, pyrimidylC<sub>1</sub>-C<sub>6</sub>alkyl, pyrazinyl, pyrazinylC<sub>1</sub>-C<sub>6</sub>alkyl, indolyl, indolylC<sub>1</sub>-C<sub>6</sub>alkyl, indanyl, indanylC<sub>1</sub>-C<sub>6</sub>alkyl, benzodioxolyl, or benzodioxolylC<sub>1</sub>-C<sub>6</sub>alkyl each or which may be unsubstituted or substituted with up to 4 substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Additional preferred compounds of formula XIV-A includes those of the following formula:



wherein:

R<sub>X</sub> represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy substituted with 0-2 R<sub>2</sub>, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, and C<sub>2</sub>-C<sub>6</sub> alkynyl;

R<sub>1</sub> is phenyl, phenylC<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl(C<sub>1</sub>-C<sub>4</sub> alkyl), naphthyl, naphthylC<sub>1</sub>-C<sub>6</sub>alkyl, indanyl, indanylC<sub>1</sub>-C<sub>6</sub> alkyl, benzodioxolanyl, or benzodioxolanylC<sub>1</sub>-C<sub>6</sub> alkyl, each of which may be substituted by up to 4 groups chosen from halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl; and

Ar<sub>2</sub> represents phenyl, benzyl, indanyl, indanyl-CH<sub>2</sub>-, benzodioxolanyl, or benzodioxolanyl-CH<sub>2</sub>-; each of which is substituted by up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, and C<sub>2</sub>-C<sub>6</sub> alkynyl.

Additional preferred compounds of formula XIV includes those wherein:

Ar<sub>2</sub> is as defined for formula XIV;

R represents up to 4 groups independently chosen from hydrogen, halogen, amino,

C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, trifluoromethyl, and trifluoromethoxy;

R<sub>1</sub> is phenyl, benzyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl(C<sub>1</sub>-C<sub>4</sub> alkyl), naphthyl,

naphthyl-CH<sub>2</sub>-, indanyl, indanyl-CH<sub>2</sub>-, benzodioxolanyl-CH<sub>2</sub>-, or

benzodioxolanyl, each of which may be substituted by up to 4 groups chosen from halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-

C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl; and

Ar<sub>1</sub> is chosen from pyrrolyl, imidazolyl, pyrazolyl, triazolyl, thiophenyl, each of which

may be optionally substituted or substituted with up to four groups

independently selected from halogen, trifluoromethyl, trifluoromethoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, and amino.

Also preferred are compounds of the formula XIV above wherein:

R represents up to 4 groups independently chosen from hydrogen, halogen, amino,

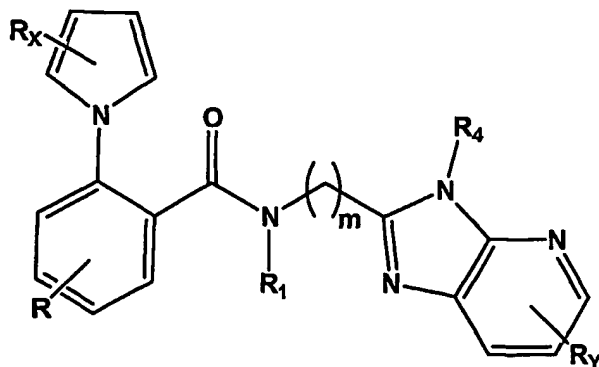
C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, trifluoromethyl, and trifluoromethoxy;

$R_1$  is benzyl which is unsubstituted or substituted by up to 4 groups chosen from halogen, hydroxy, amino,  $C_1$ - $C_6$  alkoxy, acetoxy, mono- or di( $C_1$ - $C_6$ )alkylamino, cyano, nitro,  $C_1$ - $C_6$  haloalkyl,  $C_1$ - $C_6$  alkyl;

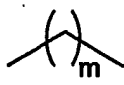
$Ar_1$  is chosen from pyrrolyl, imidazolyl, pyrazolyl, triazolyl, thiophenyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, trifluoromethyl, trifluoromethoxy,  $C_1$ - $C_6$  alkoxy,  $C_1$ - $C_6$  alkyl, and amino; and

$Ar_2$  is chosen from phenyl, benzyl, indolyl, indolyl- $CH_2$ -, indanyl, indanyl- $CH_2$ -, chromanyl, chromanyl- $CH_2$ -, benzofuranyl, benzofuranyl- $CH_2$ -, benzodioxinyl, benzodioxinyl- $CH_2$ -, benzodioxolyl- $CH_2$ -, and benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from: halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino.

Preferred compounds of formula XIV also include those of the following formula IV-B:



wherein:

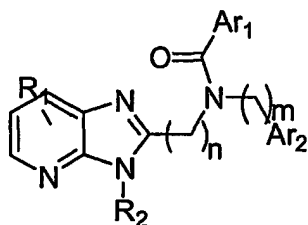
$m$  is 0, 1, 2, or 3, and  represents a carbon chain which is optionally substituted with methyl, ethyl, methoxy, ethoxy, hydroxy, halogen, or amino;

$R$  represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino,  $C_1$ - $C_6$ alkyl,  $C_2$ - $C_6$  alkenyl,  $C_1$ - $C_6$ alkynyl,  $C_1$ - $C_6$  alkoxy, acetoxy, mono- or di( $C_1$ - $C_6$ )alkylamino;

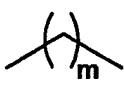
$R_x$  and  $R_y$  each represent up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino,  $C_1$ - $C_6$  alkoxy, acetoxy, mono- or di( $C_1$ - $C_6$ )alkylamino, cyano, nitro,  $C_1$ - $C_6$  haloalkyl,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl, and  $C_2$ - $C_6$  alkynyl; and

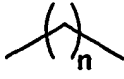
$R_1$  and  $R_4$  are independently selected from  $C_1$ - $C_6$ alkyl,  $C_3$ - $C_8$ cycloalkyl, ( $C_3$ - $C_8$  cycloalkyl) $C_1$ - $C_4$ alkyl, phenyl, phenyl $C_1$ - $C_6$ alkyl, pyridyl, and pyridyl $C_1$ - $C_6$ alkyl, each or which may be unsubstituted or substituted with up to 4 substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino and mono- or di( $C_1$ - $C_6$ )alkylamino.

The invention also provides compounds of the following formula XV:



or a pharmaceutically acceptable salt thereof, wherein;

$m$  is 0, 1, 2, or 3, and  represents a carbon chain which is optionally substituted with methyl, ethyl, methoxy, ethoxy, hydroxy, halogen, or amino;

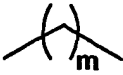
n is 0, 1, 2, or 3, and  represents a carbon chain which is optionally substituted with methyl, ethyl, methoxy, ethoxy, hydroxy, halogen, or amino; R represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, alkoxy, acetoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl;

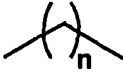
R<sub>2</sub> is

- i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and
- ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl) alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, mono- or dialkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl, optionally substituted heteroarylalkyl, optionally substituted heteroarylalkyl, or an optionally substituted heteroalicyclic or heteroalicyclicalkyl group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

Preferred compounds of formula XV include those of the following formula:

m is 1 and  represents a carbon chain which is unsubstituted;

n is 1 and  represents a carbon chain which is unsubstituted;

R represents up to 4 groups independently chosen from hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, acetoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, C<sub>1</sub>-C<sub>6</sub> haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>2</sub>-C<sub>6</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, pyridyl, pyrimidyl, and pyrazinyl, each of which may be unsubstituted or optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

Compounds of the invention may have one or more asymmetric centers or planes. Compounds of the present invention containing an asymmetrically substituted atom may be isolated in optically active or racemic forms. It is well known in the art how to prepare optically active forms, such as by resolution of racemic forms (racemates), by asymmetric synthesis, or by synthesis from optically active starting materials. Resolution of the racemates can be accomplished, for example, by conventional methods such as crystallization in the presence of a resolving agent, or chromatography, using, for example a chiral HPLC column. Many geometric isomers of olefins, C=N double bonds, and the like can also be present in the compounds described herein, and all such stable isomers are contemplated in the present invention. *Cis* and *trans* geometric isomers of the compounds of the present invention are described and may be isolated as a mixture of isomers or as separated isomeric forms. All chiral (enantiomeric and diastereomeric), and racemic forms, as well as all geometric isomeric forms of a structure are intended, unless the specific stereochemistry or isomeric form is specifically indicated.

Some compounds of the invention may exist as tautomers. Unless otherwise specified any description or claim of one tautomeric form is intended to encompass the other tautomer.

Specifically preferred compounds include those shown in the FIGS. 1 through 6. In those figures, the substituent X depicts the moiety linkage to the base compound whose structure is shown at the top of each Figure.

Additional preferred compounds of the invention include the following  
(compounds structures are shown directly above the compound chemical name in  
many instances):

1-(1-butyl)-2-phenyl-5-(N,N-di[3,4-methylenedioxyphenyl  
methyl])aminomethylimidazole;

1-(1-butyl)-2-phenyl-5-(1-[N-(3,4-methylenedioxyphenylmethyl)-N-  
phenylmethyl]amino)ethylimidazole;

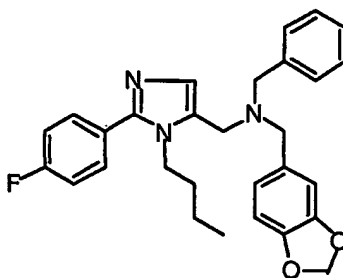
1-Butyl-2-phenyl-4-bromo-5-(N-phenylmethyl-N-[1-butyl])amino-  
methylimidazole;

1-(1-Butyl)-2-phenyl-4-methyl-5-(N-[3,4-methylenedioxyphenyl-methyl]-N-  
phenylmethyl)aminomethylimidazole;

1-(1-Butyl)-2-(4-fluorophenyl)-5-(N-[1,4-benzodioxan-6-yl]methyl-N-  
phenylmethyl) aminomethylimidazole;

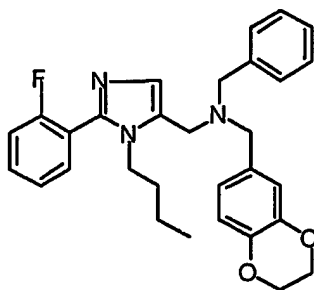
1-(1-Butyl)-2-(4-fluorophenyl)-5-(N-[3,4-methylenedioxyphenylmethyl]-N-  
phenylmethyl) aminomethylimidazole;

1-(1-Butyl)-2-(4-fluorophenyl)-5-(N-[1,4-benzodioxan-6-yl]methyl-N-  
phenylmethyl) aminomethylimidazole;

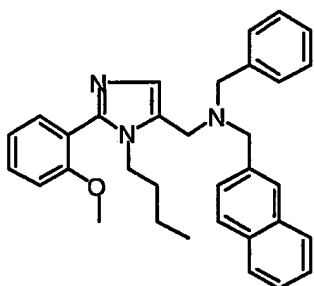


1-(1-Butyl)-2-(4-fluorophenyl)-5-(N-[3,4-methylenedioxyphenylmethyl]-N-  
phenylmethyl) aminomethylimidazole;

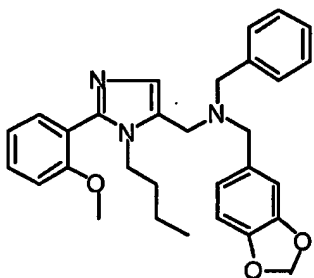




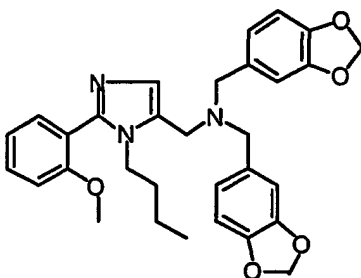
1-(1-Butyl)-2-(2-fluorophenyl)-5-(N-[1,4-benzodioxan-6-ylmethyl])-N-phenylmethylamino- methylimidazole;



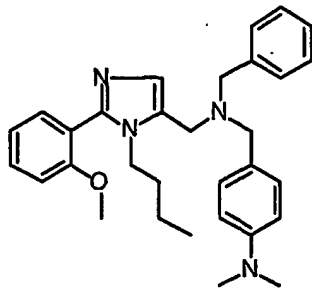
1-(1-Butyl)-2-(2-methoxyphenyl)-5-(N-[naphtha-2-ylmethyl])-N-phenylmethylamino-methylimidazole;



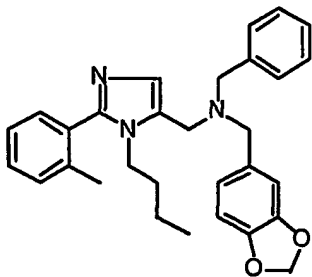
1-(1-Butyl)-2-(2-methoxyphenyl)-5-(N-[3,4-methylenedioxyphenylmethyl])-N-phenylmethyl aminomethylimidazole;



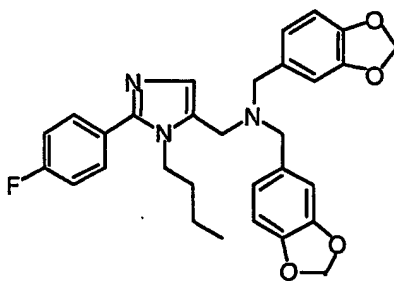
1-(1-Butyl)-2-(2-methoxyphenyl)-5-(N,N-di[3,4-methylenedioxyphenylmethyl])aminomethylimidazole;



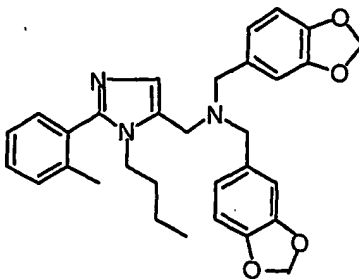
1-(1-Butyl)-2-(2-methoxyphenyl)-5-(N-[4-dimethylaminophenylmethyl]-N-phenylmethyl) aminomethylimidazole;



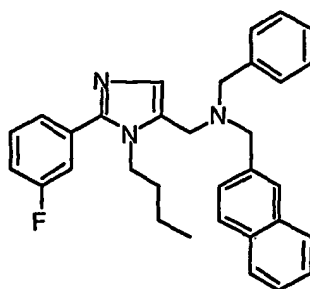
1-(1-Butyl)-2-(2-methylphenyl)-5-(N-[3,4-methylenedioxyphenylmethyl]-N-phenylmethyl) aminomethylimidazole;



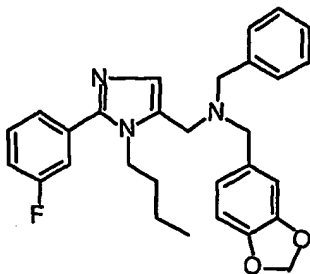
1-(1-Butyl)-2-(4-fluorophenyl)-5-(N,N-di[3,4-methylenedioxyphenylmethyl])amino- methylimidazole;



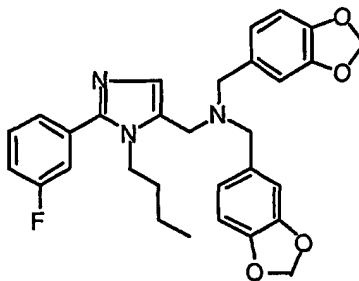
1-(1-Butyl)-2-(2-methylphenyl)-5-(N,N-di[3,4-methylenedioxyphenylmethyl])amino-1-methylimidazole;



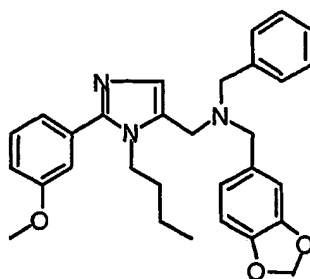
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[naphth-2-ylmethyl]-N-phenylmethyl)amino-1-methylimidazole;



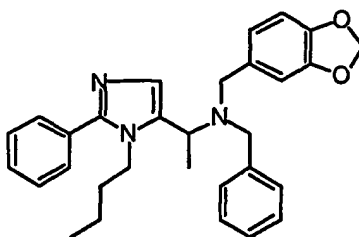
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[3,4-methylenedioxyphenylmethyl]-N-phenylmethyl) aminomethylimidazole;



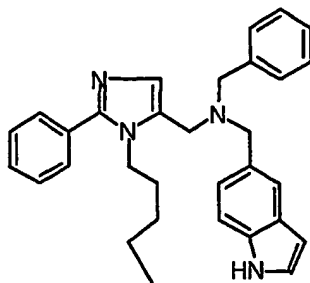
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N,N-di[3,4-methylenedioxyphenylmethyl])amino- methylimidazole;



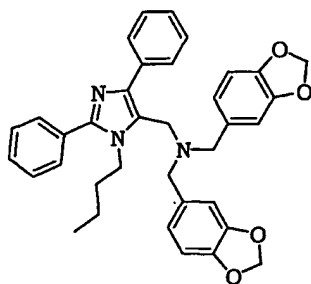
1-(1-Butyl)-2-(3-methoxyphenyl)-5-(N-[3,4-methylenedioxyphenylmethyl]-N-phenylmethyl)- aminomethylimidazole;



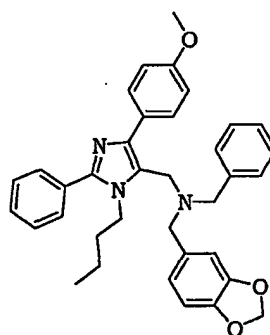
1-(1-Butyl)-2-phenyl-5-{1-(N-[3,4-methylenedioxyphenylmethyl]-N-phenylmethyl)amino} ethylimidazole;



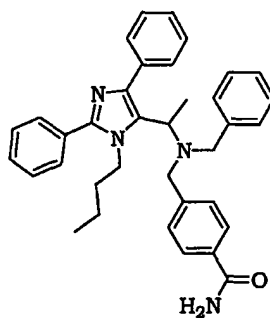
1-(1-Pentyl)-2-phenyl-5-(N-[indol-5-ylmethyl]-N-phenylmethyl)  
aminomethylimidazole;



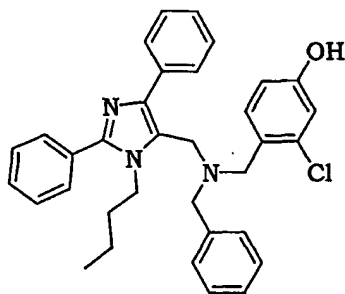
Bis-benzo[1,3]dioxol-5-ylmethyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amine



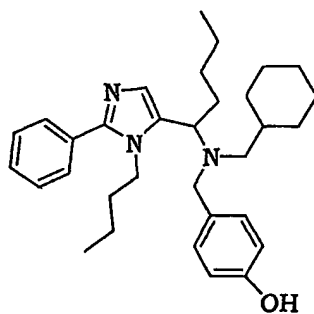
Benzo[1,3]dioxol-5-ylmethyl-benzyl-[3-butyl-5-(4-methoxy-phenyl)-2-phenyl-3*H*-imidazol-4-ylmethyl]-amine



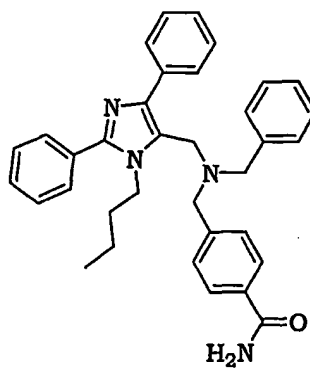
4-((Benzyl-[1-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-yl)-ethyl]-amino)-methyl)-benzamide



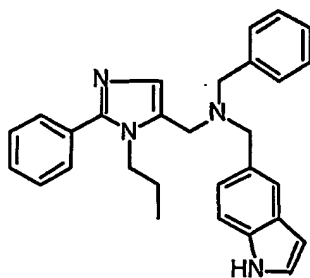
4-[[Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl]-3-chlorophenol



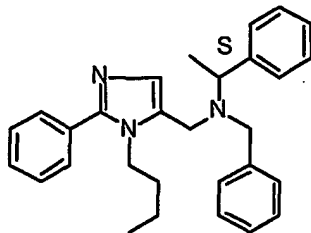
4-[[[1-(3-Butyl-2-phenyl-3*H*-imidazol-4-yl)-pentyl]-cyclohexylmethyl-amino]-methyl]-phenol



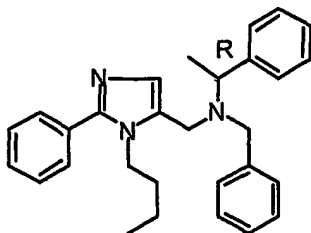
4-[[Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl]-benzamide



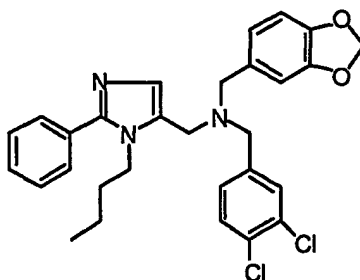
1-(1-Propyl)-2-phenyl-5-(N-[indol-5-ylmethyl]-N-phenylmethyl)  
aminomethylimidazole;



1-(1-Butyl)-2-phenyl-5-(N-[1-(S)-phenylethyl]-N-  
phenylmethyl)aminomethylimidazole;

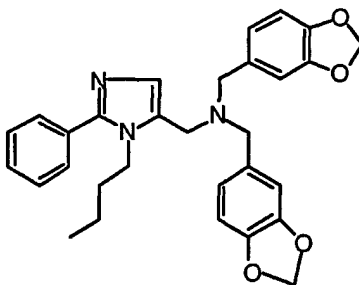


1-(1-Butyl)-2-phenyl-5-(N-[1-(R)-phenylethyl]-N-  
phenylmethyl)aminomethylimidazole;

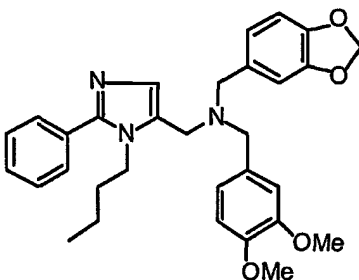


1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[3,4-  
dichlorophenyl]methyl)aminomethylimidazole;

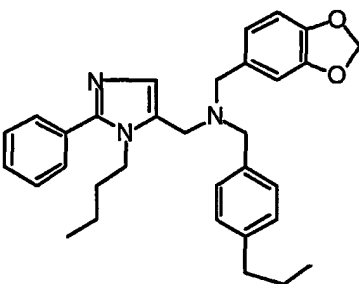




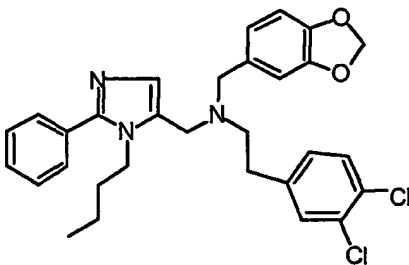
1-(1-Butyl)-2-phenyl-5-(N,N-di[3,4-methylenedioxyphenylmethyl])  
aminomethylimidazole;



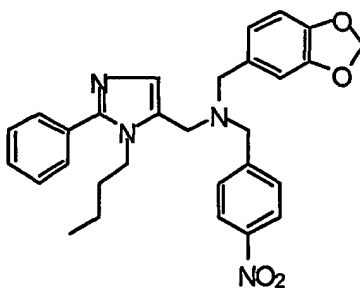
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[3,4-  
methoxyphenylmethyl])aminomethylimidazole;



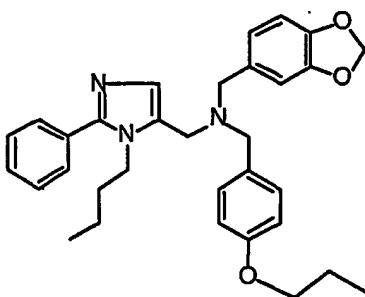
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[4-(1-  
propyl)phenylmethyl])  
aminomethylimidazole;



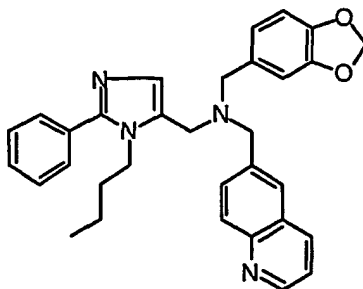
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[3,4-dichlorophenylethyl])aminomethylimidazole;



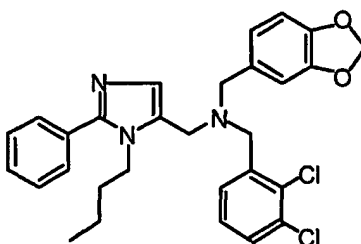
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenyl]methyl-N-[4-nitrophenylmethyl])aminomethylimidazole;



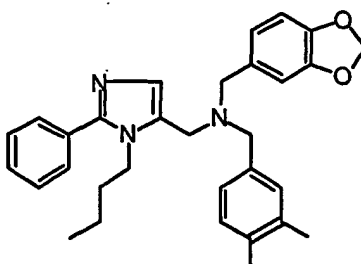
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[4-(1-propyloxy)phenylmethyl])aminomethylimidazole;



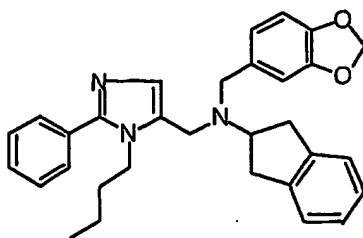
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[quinol-6-ylmethyl])- aminomethylimidazole;



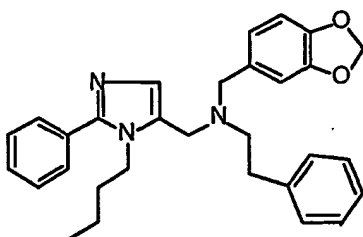
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[2,3-dichlorophenylmethyl])-aminomethylimidazole;



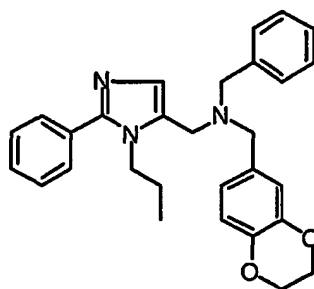
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[3,4-dimethylphenylmethyl])-aminomethylimidazole;



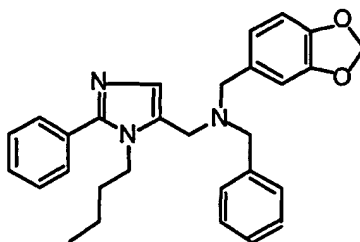
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenyl]methyl-N-[indan-2-yl])aminomethylimidazole;



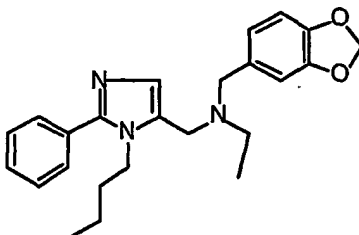
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[2-phenylethyl])amino-methylimidazole;



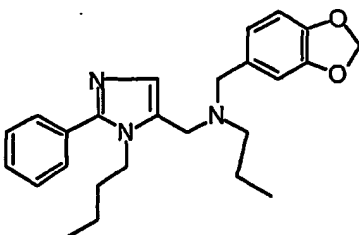
1-(1-Propyl)-2-phenyl-5-(N-[1,4-benzodioxan-6-ylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



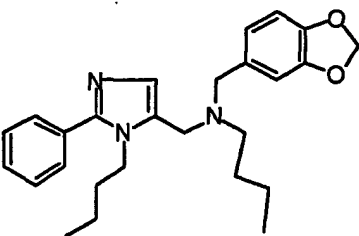
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



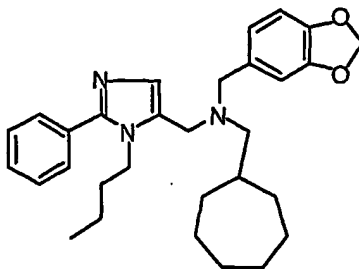
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-ethyl)aminomethylimidazole;



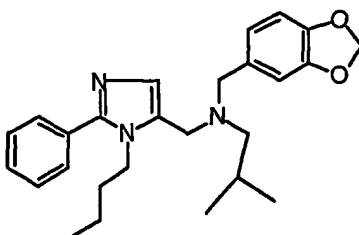
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-propyl])aminomethyl-imidazole;



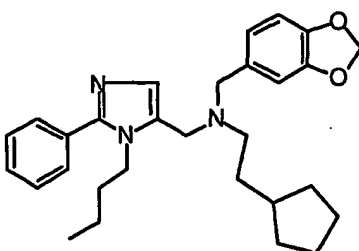
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-butyl])aminomethyl-imidazole;



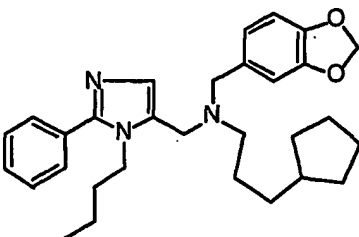
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-cycloheptylmethyl)amino-methylimidazole;



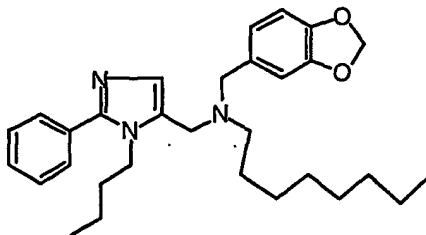
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-isobutyl)aminomethyl-imidazole;



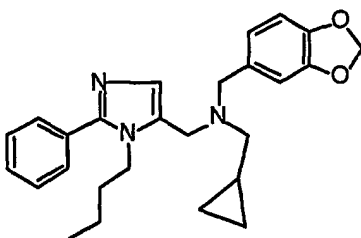
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[2-cyclopentylethyl])amino-methylimidazole;



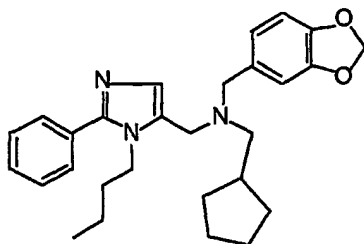
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[3-cyclopentylpropyl])amino-methylimidazole;



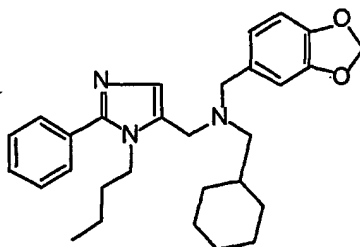
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-n-octyl])aminomethyl-imidazole;



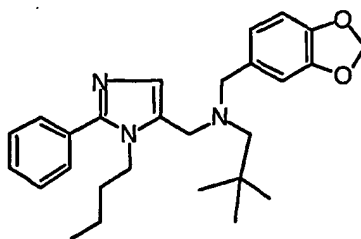
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-cyclopropylmethyl)amino-methylimidazole;



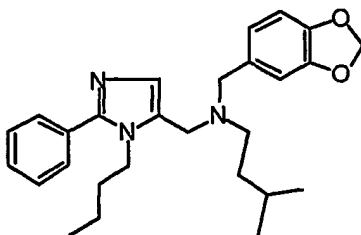
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-cyclopentylmethyl)amino-methylimidazole;



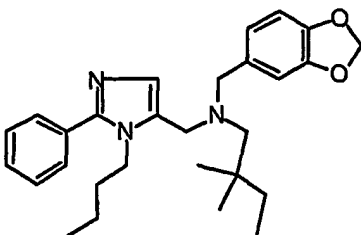
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-cyclohexylmethyl)amino-methylimidazole;



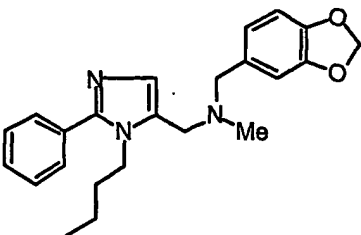
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[tert-amyl])aminomethylimidazole;



1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-(3-methyl)butyl])amino-methylimidazole;

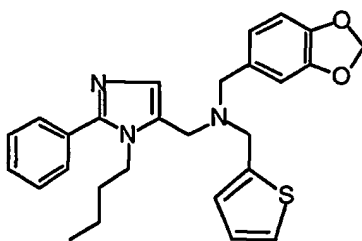


1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-(2,2-dimethyl)butyl])aminomethylimidazole;

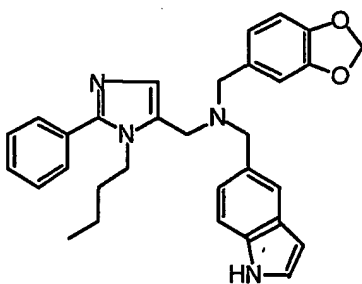


1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-methyl)aminomethylimidazole;

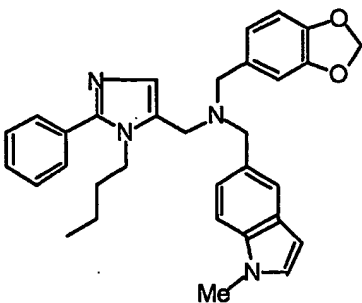




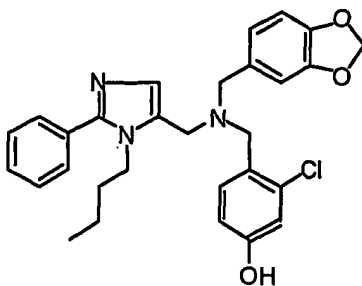
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[2-thiophenylmethyl])amino-methylimidazole;



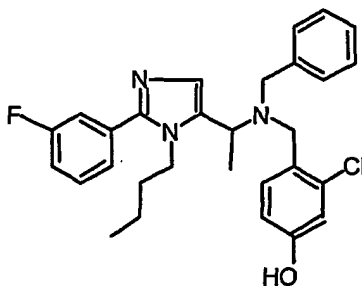
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[indol-5-ylmethyl])amino-methylimidazole;



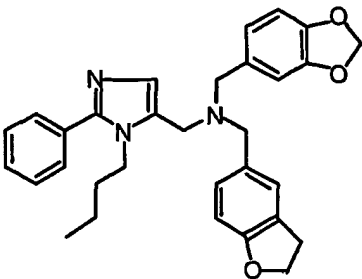
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-[1-methylindol-5-ylmethyl])aminomethylimidazole;



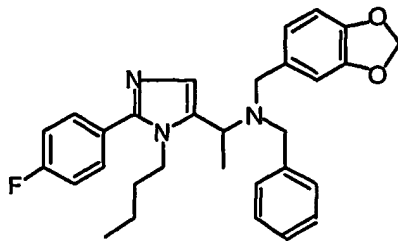
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenyl]methyl-N-[4-hydroxy-2-chlorophenyl]-methyl)aminomethylimidazole;



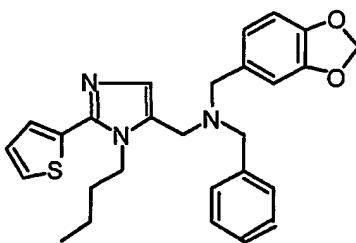
1-(1-Butyl)-2-(3-fluorophenyl)-5-(1-[N-(2-chloro-4-hydroxyphenyl)methyl-N-phenylmethyl]) aminoethylimidazole;



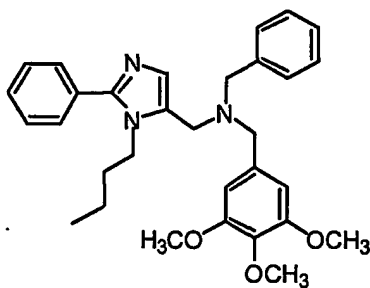
1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenyl]methyl-N-[2,3-dihydrobenzo[b]furan-5-yl]methyl)aminomethylimidazole;



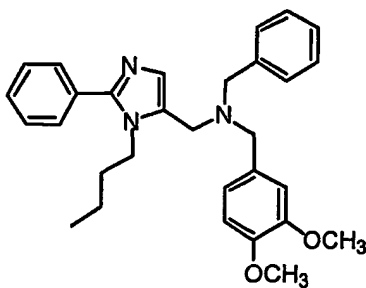
1-Butyl-2-(4-fluorophenyl)-5-(1-[N-(3,4-methylenedioxyphenyl)methyl-N-phenylmethyl]-amino)ethylimidazole;



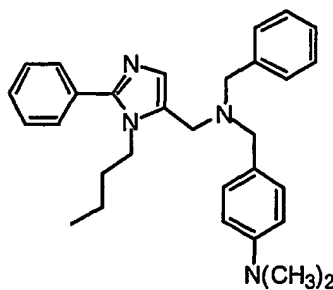
1-(1-Butyl)-2-(2-thienyl)-5-(N-[3,4-methylenedioxyphenyl]methyl-N-phenylmethyl)aminomethylimidazole;



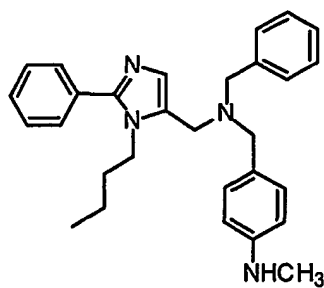
1-(1-Butyl)-2-phenyl-5-(N-[3,4,5-trimethoxyphenylmethyl]-N-phenylmethyl)aminomethylimidazole;



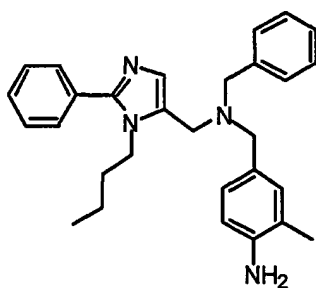
1-(1-Butyl)-2-phenyl-5-(N-phenylmethyl-N-[3,4-dimethoxyphenylmethyl])aminomethyl-imidazole;



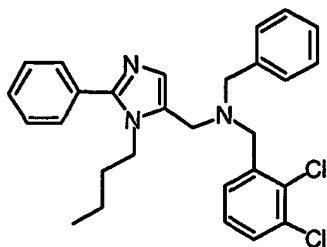
1-(1-Butyl)-2-phenyl-5-(N-[4-dimethylaminophenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



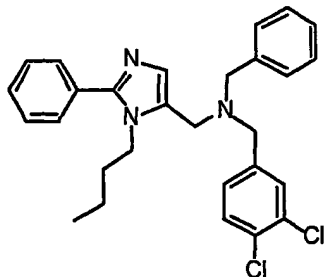
1-(1-Butyl)-2-phenyl-5-(N-[4-methylaminophenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



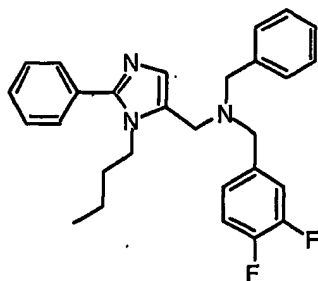
1-(1-Butyl)-2-phenyl-5-(N-[3-methyl-4-aminophenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



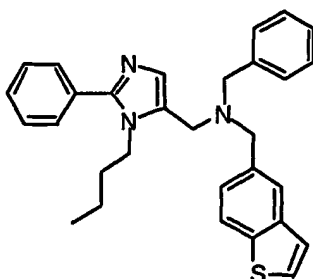
1-(1-Butyl)-2-phenyl-5-(N-[2,3-dichlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



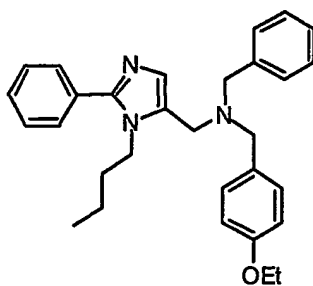
1-(1-Butyl)-2-phenyl-5-(N-[3,4-dichlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



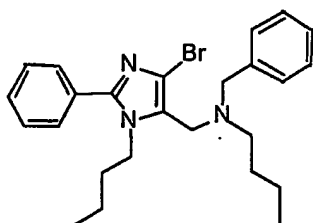
1-(1-Butyl)-2-phenyl-5-(N-[3,4-difluorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



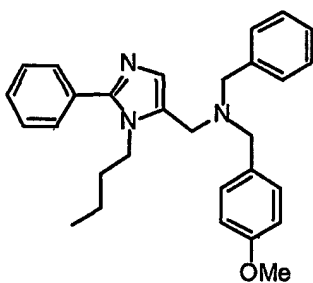
1-(1-Butyl)-2-phenyl-5-(N-(benzo[b]thiophen-5-ylmethyl)-N-phenylmethyl)aminomethylimidazole;



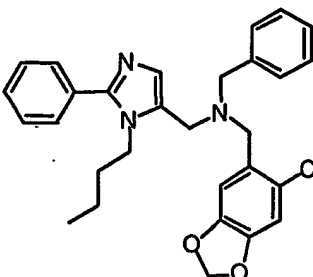
1-(1-Butyl)-2-phenyl-5-(N-[4-ethoxyphenylmethyl]-N-phenylmethyl)aminomethylimidazole;



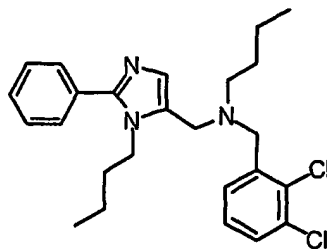
1-(1-Butyl)-2-phenyl-4-bromo-5-(N-phenylmethyl-N-[1-butyl])aminomethylimidazole;



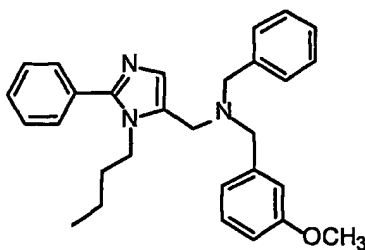
1-(1-Butyl)-2-phenyl-5-(N-[4-methoxyphenylmethyl]-N-phenylmethyl)aminomethylimidazole;



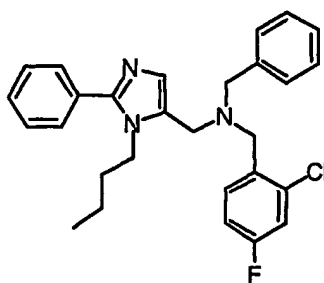
1-(1-Butyl)-2-phenyl-5-(N-[6-chloro-3,4-methylenedioxyphenylmethyl]-N-phenylmethyl)-aminomethylimidazole;



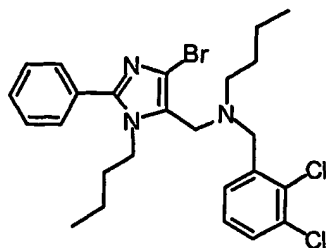
1-(1-Butyl)-2-phenyl-5-(N-[2,3-dichlorophenylmethyl]-N-[1-butyl])aminomethylimidazole;



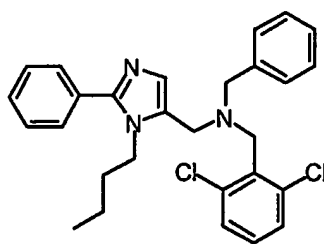
1-(1-Butyl)-2-phenyl-5-(N-[3-methoxyphenylmethyl]-N-phenylmethyl)aminomethylimidazole;



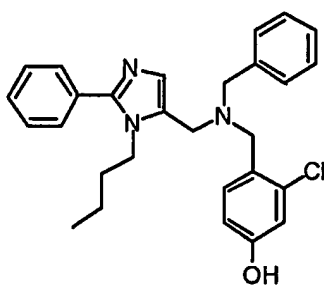
1-(1-Butyl)-2-phenyl-5-(N-[2-chloro-4-fluorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



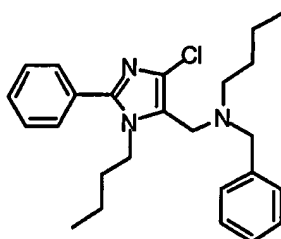
1-(1-Butyl)-2-phenyl-4-bromo-5-(N-[2,3-dichlorophenylmethyl]-N-[1-butyl])aminomethylimidazole;



1-(1-Butyl)-2-phenyl-5-(N-[2,6-dichlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;

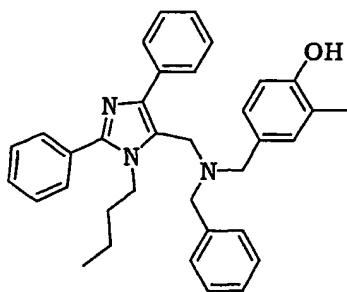


1-(1-Butyl)-2-phenyl-5-(N-[2-chloro-4-hydroxyphenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;

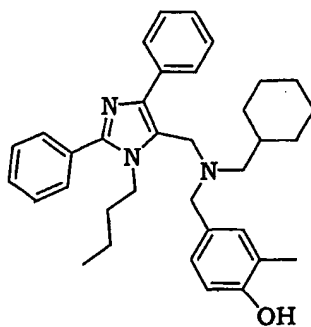


1-(1-Butyl)-2-phenyl-4-chloro-5-(N-phenylmethyl-N-[1-butyl])aminomethylimidazole;

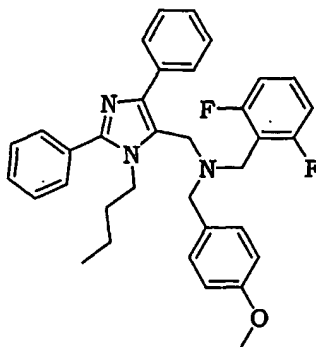




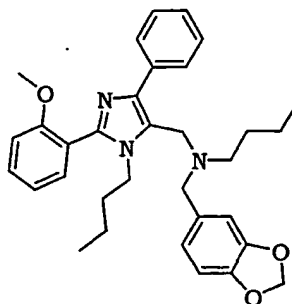
4-[(Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino)-methyl]-2-methyl-phenol



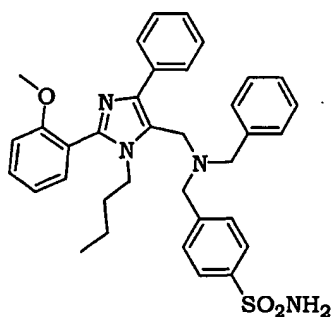
4-[(3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-cyclohexylmethyl-amino]-methyl)-2-methyl-phenol



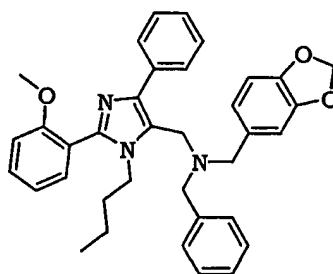
(3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(2,6-difluoro-benzyl)-(4-methoxy-benzyl)-amine



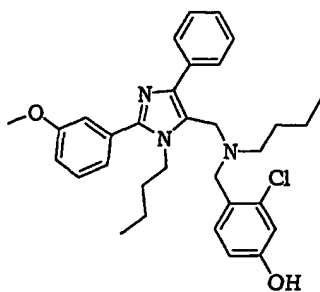
Benzo[1,3]dioxol-5-ylmethyl-butyl-[3-butyl-2-(2-methoxy-phenyl)-5-phenyl-3*H*-imidazol-4-yl methyl]-amine



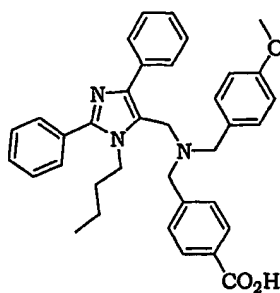
4-({Benzyl-[3-butyl-2-(2-methoxy-phenyl)-5-phenyl-3*H*-imidazol-4-ylmethyl]-amino)-methyl}-benzenesulfonamide



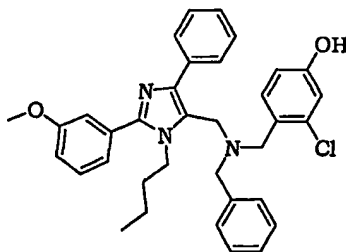
Benzo[1,3]dioxol-5-ylmethyl-benzyl-[3-butyl-2-(2-methoxy-phenyl)-5-phenyl-3*H*-imidazol-4-yl methyl]-amine



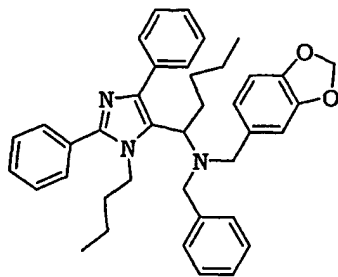
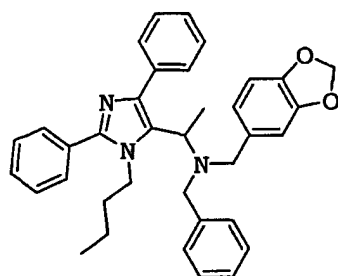
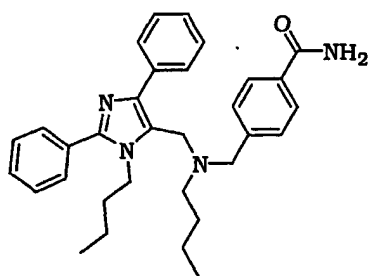
4-((3-Butyl-2-(3-methoxy-phenyl)-5-phenyl-3*H*-imidazol-4-ylmethyl)-amino)-methyl)-3-chloro-phenol

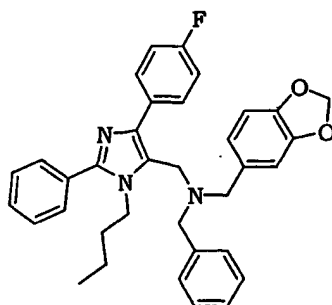


4-((3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(4-methoxy-benzyl)-amino)-methyl)-benzoic acid

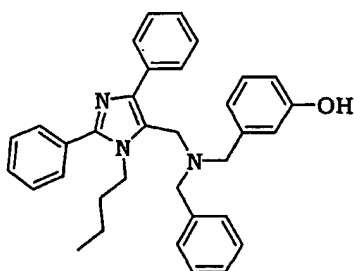


4-((Benzyl-3-butyl-2-(3-methoxy-phenyl)-5-phenyl-3*H*-imidazol-4-ylmethyl)-amino)-methyl)-3-chloro-phenol

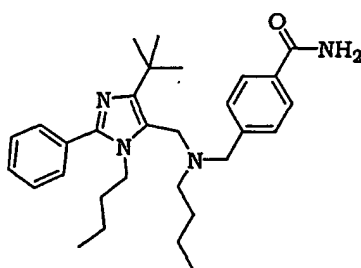
Benzo[1,3]dioxol-5-ylmethyl-benzyl-[1-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-yl)-pentyl]-amineBenzo[1,3]dioxol-5-ylmethyl-benzyl-[1-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-yl)-ethyl]-amine4-[(Butyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl)-benzamide



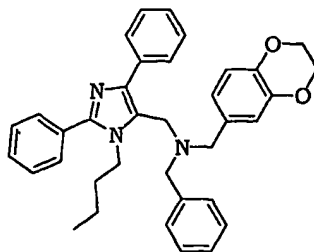
Benzo[1,3]dioxol-5-ylmethyl-benzyl-[3-butyl-5-(4-fluoro-phenyl)-2-phenyl-3*H*-imidazol-4-ylmethyl]-amine



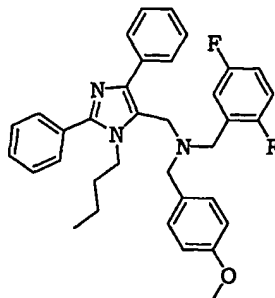
3-[[Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl]-phenol



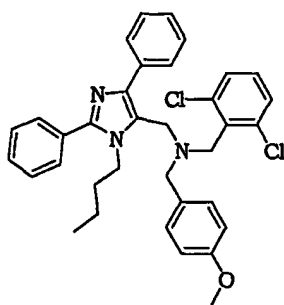
4-[[Butyl-(3-butyl-5-*tert*-butyl-2-phenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl]-benzamide



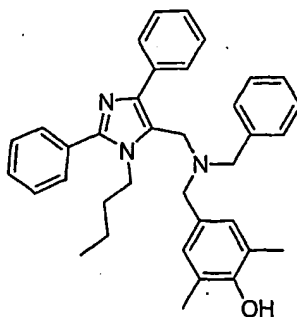
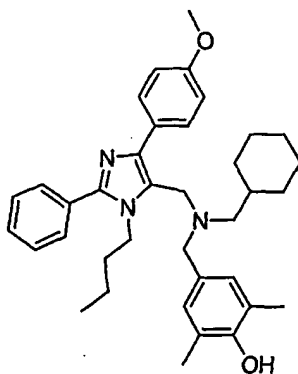
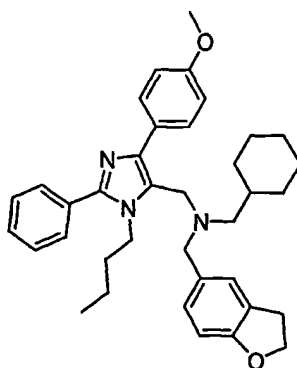
Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(2,3-dihydro-benzo[1,4]dioxin-6-ylmethyl)-amine

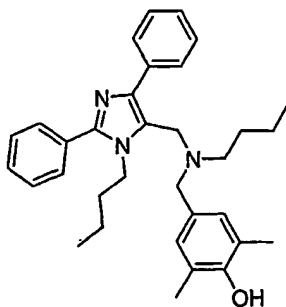
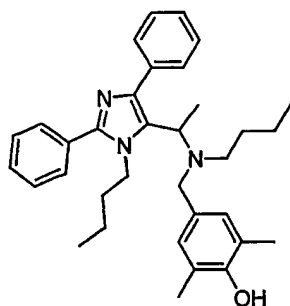
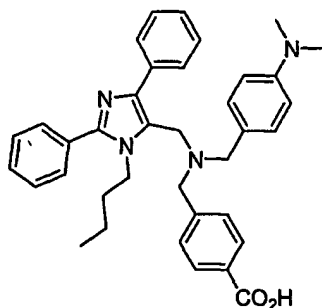


(3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(2,5-difluoro-benzyl)-(4-methoxy-benzyl)-amine

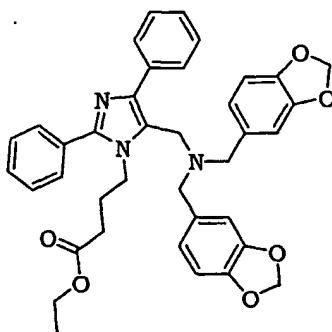


(3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(2,6-dichloro-benzyl)-(4-methoxy-benzyl)-amine

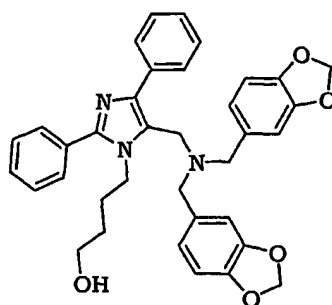
4-[[Benzyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino]-methyl]-2,6-dimethyl-phenol4-(((3-Butyl-5-(4-methoxy-phenyl)-2-phenyl-3*H*-imidazol-4-ylmethyl)-cyclohexylmethyl-amino)-methyl)-2,6-dimethyl-phenol[3-Butyl-5-(4-methoxy-phenyl)-2-phenyl-3*H*-imidazol-4-ylmethyl]-cyclohexylmethyl-(2,3-dihydro-benzofuran-5-ylmethyl)-amine

4-((Butyl-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-amino)-methyl)-2,6-dimethyl-phenol4-((Butyl-[1-(3-butyl-2,5-diphenyl-3*H*-imidazol-4-yl)-ethyl]-amino)-methyl)-2,6-dimethyl-phenol4-(((3-Butyl-2,5-diphenyl-3*H*-imidazol-4-ylmethyl)-(4-dimethylamino-benzyl)-amino)-methyl)-benzoic acid

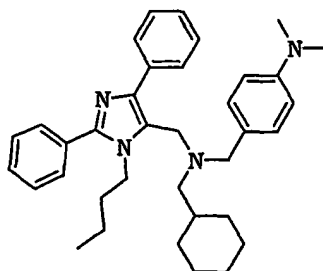




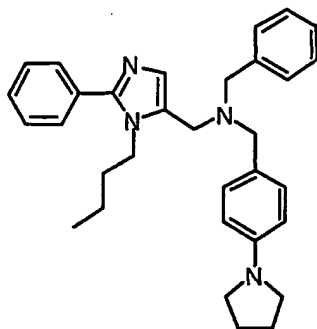
4-[[5-[[Bis-benzo[1,3]dioxol-5-ylmethyl-amino)-methyl]-2,4-diphenyl-imidazol-1-yl]-butyric acid ethyl ester



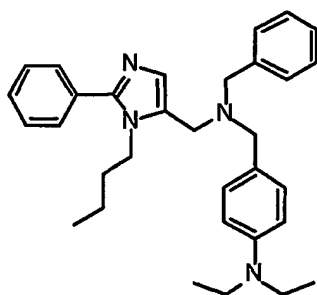
4-[[5-[[Bis-benzo[1,3]dioxol-5-ylmethyl-amino)-methyl]-2,4-diphenyl-imidazol-1-yl]-butan-1-ol



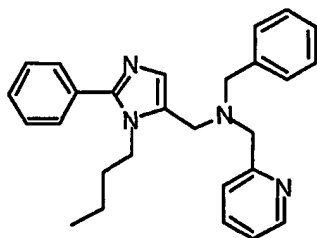
(4-[[3-Butyl-2,5-diphenyl-3H-imidazol-4-ylmethyl]-cyclohexylmethyl-amino]-methyl)-phenyl)-dimethyl-amine



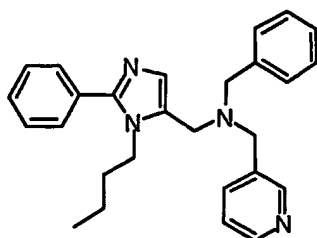
1-(1-Butyl)-2-phenyl-5-(N-[4-(1-pyrrolidinyl)phenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



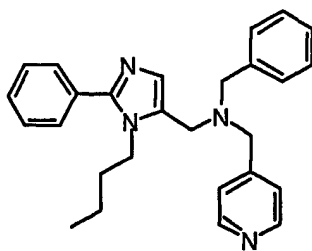
1-(1-Butyl)-2-phenyl-5-(N-[4-diethylaminophenylmethyl]-N-phenylmethyl)aminomethyl-imidazole;



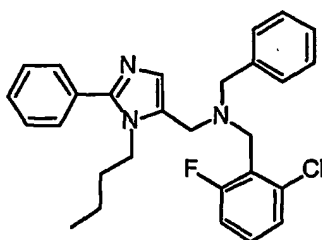
1-(1-Butyl)-2-phenyl-5-(N-[pyridin-2-ylmethyl]-N-phenylmethyl)aminomethylimidazole;



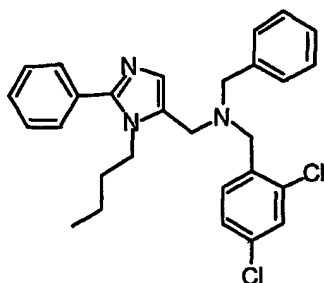
1-(1-Butyl)-2-phenyl-5-(N-[pyridin-3-ylmethyl]-N-phenylmethyl)aminomethylimidazole;



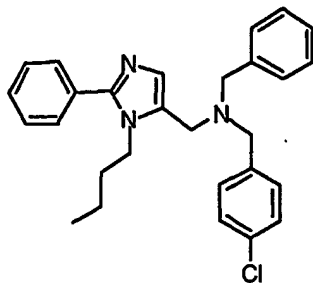
1-(1-Butyl)-2-phenyl-5-(N-[pyridin-4-ylmethyl]-N-phenylmethyl)aminomethylimidazole;



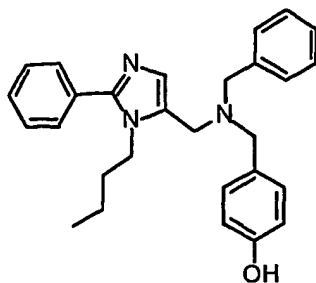
1-(1-Butyl)-2-phenyl-5-(N-[2-fluoro-6-chlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



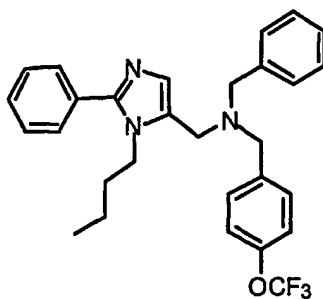
1-(1-Butyl)-2-phenyl-5-(N-[2,4-dichlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



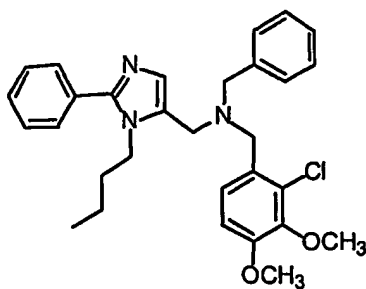
1-(1-Butyl)-2-phenyl-5-(N-[4-chlorophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



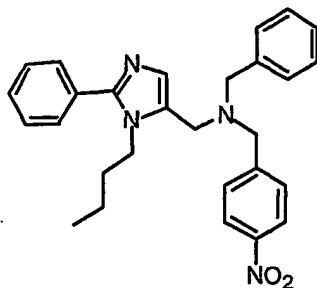
1-(1-Butyl)-2-phenyl-5-(N-[4-hydroxyphenylmethyl]-N-phenylmethyl)aminomethylimidazole;



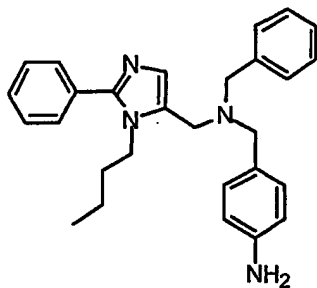
1-(1-Butyl)-2-phenyl-5-(N-[4-trifluoromethoxyphenylmethyl]-N-phenylmethyl)aminomethyl-imidazole);



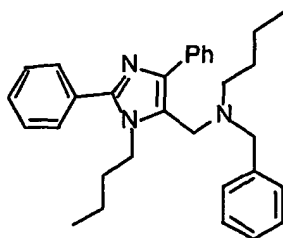
1-(1-Butyl)-2-phenyl-5-(N-[2-chloro-3,4-dimethoxyphenylmethyl]-N-phenylmethyl)amino-methylimidazole);



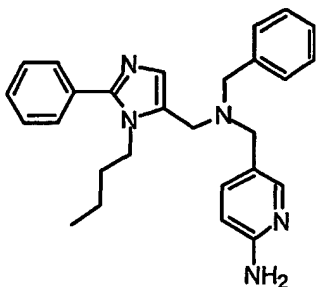
1-(1-Butyl)-2-phenyl-5-(N-[4-nitrophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



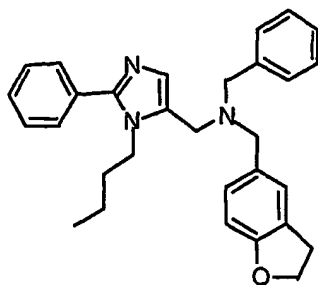
1-(1-Butyl)-2-phenyl-5-(N-[4-aminophenylmethyl]-N-phenylmethyl)aminomethylimidazole;



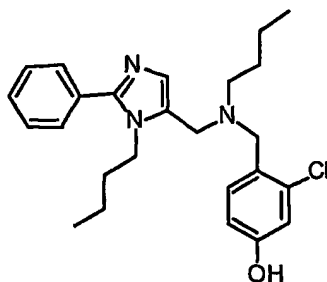
1-(1-Butyl)-2,4-diphenyl-5-(N-phenylmethyl-N-[1-butyl])aminomethylimidazole;



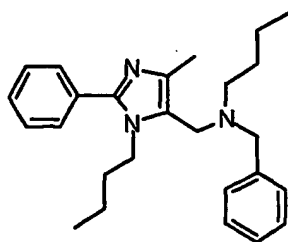
1-(1-Butyl)-2-phenyl-5-(N-[2-aminopyridin-5-ylmethyl]-N-phenylmethyl)aminomethylimidazole



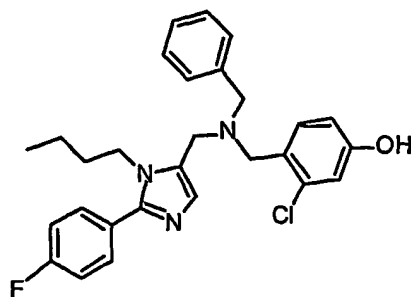
1-(1-Butyl)-2-phenyl-5-(N-[2,3-dihydrobenzo[b]furan-5-ylmethyl]-N-phenylmethyl)amino-methylimidazole;



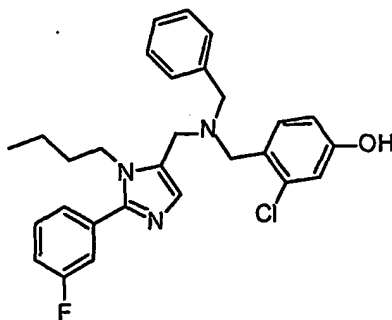
1-(1-Butyl)-2-phenyl-5-(N-[2-chloro-4-hydroxyphenylmethyl]-N-[1-butyl]aminomethyl-imidazole)



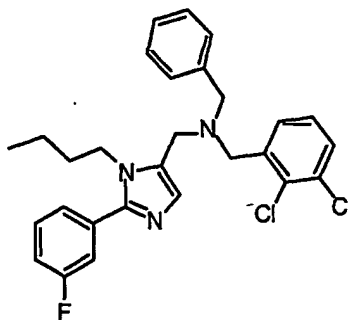
1-(1-Butyl)-2-phenyl-4-methyl-5-(N-phenylmethyl-N-[1-butyl])aminomethylimidazole;



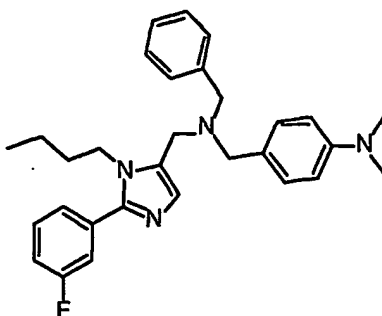
1-(1-Butyl)-2-(4-fluorophenyl)-5-(N-[2-chloro-4-hydroxyphenylmethyl]-N-phenylmethyl)-aminomethylimidazole;



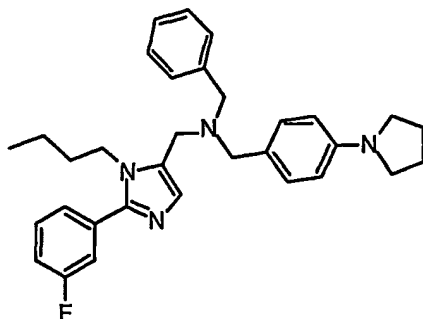
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[2-chloro-4-hydroxyphenylmethyl]-N-phenylmethyl)-aminomethylimidazole;



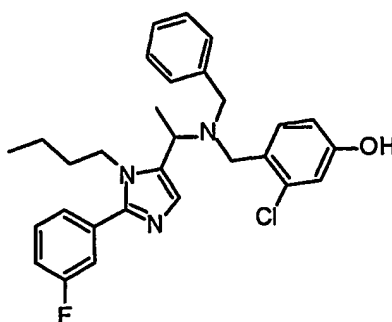
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[2,3-dichlorophenylmethyl]-N-phenylmethyl)amino-methylimidazole;



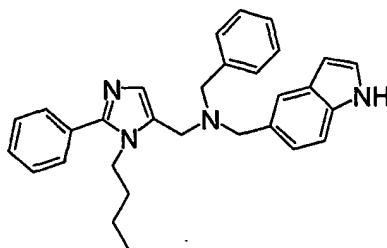
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[4-dimethylaminophenylmethyl]-N-phenylmethyl)amino-methylimidazole;



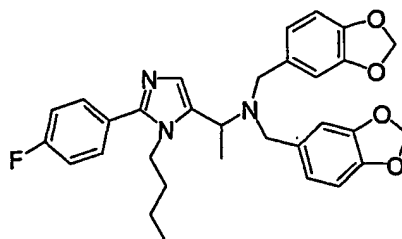
1-(1-Butyl)-2-(3-fluorophenyl)-5-(N-[4-(1-pyrrolidinyl)phenylmethyl]-N-phenylmethyl)amino-methylimidazole;



1-(1-Butyl)-2-(3-chlorophenyl)-5-(1-[N-(2-chloro-4-hydroxyphenylmethyl)-N-phenylmethyl] amino)ethylimidazole;

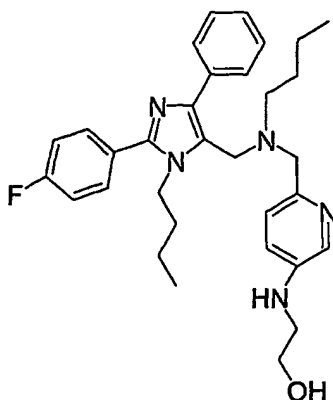


1-(1-Butyl)-2-phenyl-5-(N-[indol-5-ylmethyl]-N-phenylmethyl)aminomethylimidazole;



1-(1-Butyl)-2-(4-fluorophenyl)-5-(1-N,N-di[3,4-methylenedioxyphenylmethyl]amino)ethylimidazole;





2-[[5-((Butyl[(1-butyl-2,4-diphenylimidazol-5-yl)methyl]amino)methyl)-2-pyridyl]amino]ethan-1-ol;

As discussed above, preferred compounds of the invention exhibit good activity in standard *in vitro* C5 receptor mediated chemotaxis assay, specifically the assay as specified in Example 12, which follows. References herein to “standard *in vitro* C5 receptor mediated chemotaxis assay” are intended to refer to that protocol as defined in Example 12 which follows. Preferred compounds of the invention exhibit an  $EC_{50}$  of about 100  $\mu M$  or less in such a standard C5a mediated chemotaxis assay, more preferably an  $EC_{50}$  of about 10  $\mu M$  or less in such a standard C5a mediated chemotaxis assay, still more preferably an  $EC_{50}$  of about 1  $\mu M$  in such a standard C5a mediated chemotaxis assay, even more preferably an  $EC_{50}$  of about 0.1  $\mu M$  in such a standard C5a mediated chemotaxis assay.

Additional assays suitable for determining the effects of small molecule compounds on C5a receptor binding and receptor modulatory activity, as well as assays suitable for measuring their effects on C5a-induced neutropenia *in vivo*, can be found in the published literature, for example in US patent 5,807,824, which is incorporated herein by reference for its disclosure in this regard in Examples 6-9, columns 19-23, as well as for its discussion of complement and inflammation at columns 1-2. Those of skill in the art will recognize that such assays can be readily adapted to the use of cells or animals of different species as deemed appropriate.

In one aspect of the invention, one or more compounds of the invention, preferably in solution in a pharmaceutically acceptable carrier as a pharmaceutical preparation, is used to perfuse a donor organ prior to transplantation of the organ into a recipient patient. Such perfusion is preferably carried out using a solution comprising an concentration of the compound of the invention that is an effective amount sufficient to inhibit C5a mediated effects in vitro or in vivo. Such perfusion preferably reduces the severity or frequency of one or more of the inflammatory sequelae following organ transplantation when compared to that occurring in control (including, without restriction, historical control) transplant recipients who have received transplants of donor organs that have not been so perfused.

#### **Definitions**

In certain situations, the compounds of of the invention may contain one or more asymmetric elements such as stereogenic centers, stereogenic axes and the like, e.g. asymmetric carbon atoms, so that the compounds can exist in different stereoisomeric forms. These compounds can be, for example, racemates or optically active forms. For compounds with two or more asymmetric elements, these

compounds can additionally be mixtures of diastereomers. In these situations, the single enantiomers, i.e., optically active forms, can be obtained by asymmetric synthesis, synthesis from optically pure precursors or by resolution of the racemates. Resolution of the racemates can be accomplished, for example, by conventional methods such as crystallization in the presence of a resolving agent, or chromatography, using, for example a chiral HPLC column.

The term "substituted", as used herein, means that any one or more hydrogens on the designated atom is replaced with a selection from the indicated group, provided that the designated atom's normal valence is not exceeded, and that the substitution results in a stable compound. When a substituent is keto (i.e., =O), then 2 hydrogens on the atom are replaced. Keto substituents are not present on aromatic moieties. The present invention is intended to include all isotopes of atoms occurring in the present compounds. Isotopes include those atoms having the same atomic number but different mass numbers. By way of general example, and without limitation, isotopes of hydrogen include tritium and deuterium and isotopes of carbon include  $^{11}\text{C}$ ,  $^{13}\text{C}$ , and  $^{14}\text{C}$ .

When any variable occurs more than one time in any constituent or formula for a compound, its definition at each occurrence is independent of its definition at every other occurrence. Thus, for example, if a group is shown to be substituted with 0-2  $\text{R}^*$ , then said group may optionally be substituted with up to two  $\text{R}^*$  groups and  $\text{R}^*$  at each occurrence is selected independently from the definition of  $\text{R}^*$ . Also, combinations of substituents and/or variables are permissible only if such combinations result in stable compounds.

As indicated herein, various substituents of the compounds of the present invention and various formulae set forth herein are "optionally substituted", including, e.g.,  $\text{Ar}_1$ ,  $\text{Ar}_2$ ,  $\text{R}$ ,  $\text{R}_1$ ,  $\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_{3\text{A}}$ ,  $\text{R}_4$ ,  $\text{R}_5$ ,  $\text{R}_6$ ,  $\text{R}_7$ ,  $\text{R}_\text{A}$ ,  $\text{R}_\text{A}'$ ,  $\text{R}_\text{B}$ , and  $\text{R}_\text{C}$ . When substituted, those substituents may be substituted at one or more of any of the available positions, typically 1, 2, 3, or 4 positions, by one or more suitable groups such as those disclosed herein.

Suitable groups or "substituted" moieties of compounds of the invention include e.g., halogen such as fluoro, chloro, bromo or iodo; cyano; hydroxyl; nitro; azido; alkanoyl such as a C<sub>1-6</sub> alkanoyl group such as acyl and the like; carboxamido; alkyl groups including those groups having 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5, or 6 carbon atoms; alkenyl and alkynyl groups including groups having one or more unsaturated linkages and from 2 to about 12 carbon, or 2, 3, 4, 5 or 6 carbon atoms; alkoxy groups having those having one or more oxygen linkages and from 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5 or 6 carbon atoms; aryloxy such as phenoxy; alkylthio groups including those moieties having one or more thioether linkages and from 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5 or 6 carbon atoms; alkylsulfinyl groups including those moieties having one or more sulfinyl linkages and from 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5, or 6 carbon atoms; alkylsulfonyl groups including those moieties having one or more sulfonyl linkages and from 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5, or 6 carbon atoms; aminoalkyl groups such as groups having one or more N atoms and from 1 to about 12 carbon atoms, or 1, 2, 3, 4, 5 or 6 carbon atoms; carbocyclic aryl having 6 or more carbons, particularly phenyl (e.g. an Ar group being a substituted or unsubstituted biphenyl moiety); arylalkyl having 1 to 3 separate or fused rings and from 6 to about 18 carbon ring atoms, with benzyl being a preferred group; aralkoxy having 1 to 3 separate or fused rings and from 6 to about 18 carbon ring atoms, with O-benzyl being a preferred group; or a heteroaromatic or heteroalicyclic group having 1 to 3 separate or fused rings with 3 to about 8 members per ring and one or more N, O or S atoms, e.g. coumarinyl, quinolinyl, pyridyl, pyrazinyl, pyrimidyl, furyl, pyrrolyl, thienyl, thiazolyl, oxazolyl, imidazolyl, indolyl, benzofuranyl, benzothiazolyl, tetrahydrofuranyl, tetrahydropyranyl, piperidinyl, morpholino and pyrrolidinyl.

As used herein, "alkyl" is intended to include both branched and straight-chain saturated aliphatic hydrocarbon groups, having the specified number of carbon atoms. Examples of alkyl include, but are not limited to, methyl, ethyl, n-propyl, i-propyl, n-butyl, s-butyl, t-butyl, n-pentyl, and s-pentyl. Preferred alkyl

groups are C<sub>1</sub>-C<sub>8</sub> and C<sub>1-6</sub> alkyl groups. Especially preferred alkyl groups are methyl, ethyl, propyl, butyl, 3-pentyl. The term C<sub>1-6</sub> alkyl as used herein includes alkyl groups consisting of 1 to 6 carbon atoms, which may contain a cyclopropyl moiety. Suitable examples are methyl or ethyl.

"Cycloalkyl" is intended to include saturated ring groups, having the specified number of carbon atoms, such as cyclopropyl, cyclobutyl, cyclopentyl, or cyclohexyl and bridged or caged saturated ring groups such as norbornane or adamantane and the like.

In the term "(C<sub>3-6</sub> cycloalkyl)C<sub>1-4</sub> alkyl", as defined above, the point of attachment is on the alkyl group. This term encompasses, but is not limited to, cyclopropylmethyl, cyclohexylmethyl and cyclohexylethyl.

"Alkenyl" is intended to include hydrocarbon chains of either a straight or branched configuration comprising one or more unsaturated carbon-carbon bonds, which may occur in any stable point along the chain, such as ethenyl and propenyl.

"Alkynyl" is intended to include hydrocarbon chains of either a straight or branched configuration comprising one or more triple carbon-carbon bonds that may occur in any stable point along the chain, such as ethynyl and propynyl.

"Haloalkyl" is intended to include both branched and straight-chain saturated aliphatic hydrocarbon groups having the specified number of carbon atoms, substituted with 1 or more halogen (for example  $-C_v(X^i)_{w_i}(H_{2v+1-\sum(w_i)})$  where  $v = 1$  to  $3$ ;  $X^i = F(i=1)$ ,  $Cl(i=2)$ ,  $Br(i=3)$ ,  $I(i=4)$  and  $\sum w_i \leq 2v+1$ ). Examples of haloalkyl include, but are not limited to, trifluoromethyl, trichloromethyl, pentafluoroethyl, and pentachloroethyl.

"Alkoxy" represents an alkyl group as defined above with the indicated number of carbon atoms attached through an oxygen bridge. Examples of alkoxy include, but are not limited to, methoxy, ethoxy, n-propoxy, i-propoxy, n-butoxy, 2-butoxy, t-butoxy, n-pentoxy, 2-pentoxy, 3-pentoxy, isopentoxy, neopentoxy, n-hexoxy, 2-hexoxy, 3-hexoxy, and 3-methylpentoxy.

As used herein, the term "carbocyclic aryl" indicates aromatic groups containing only carbon in the aromatic ring. Such aromatic groups may be further

substituted with carbon or non-carbon atoms or groups. Typical carbocyclic aryl groups contain 1 to 3 separate of fused rings and from 6 to about 18 ring atoms, without heteroatoms as ring members. Specifically preferred carbocyclic aryl groups include phenyl, naphthyl, including 1-naphthyl and 2-naphthyl, and acenaphthyl.

By the term "energetically accessible conformer" is meant any conformer of a compound that falls within about a 15 Kcal/mol window above the lowest energy conformation (as for example that found in a monte carlo or systematic conformational search) by using MM2, MM3, or MMFF force fields as implemented in molecular modeling software such as MacroModel® v 7.0, Schrödinger, Inc., Portland, Oregon United States and Jersey City, New Jersey, United States, <http://www.schrodinger.com> or the like.

Peptidomimetic compounds are generally compounds with "chemical structures derived from bioactive peptides which imitate natural molecules" (Murray Goodman and Seonggu Ro, "Peptidomimetics for Drug Design" chapter twenty in Burger's Medicinal Chemistry and Drug Discovery, Volume 1: Principles and Practice, Manfred E. Wolff, ed. John Wiley & Sons, Inc., NY, 1995, pp. 801-861.) As used herein and in the claims, the term peptidomimetic additionally comprises peptoid compounds, which are compounds that comprise oligomers of N-substituted natural amino acids, and the term further comprises any compound having more than two amide bonds.

As used herein, the terms "heteroaryl" and "heteroalicyclic" group are intended to indicate a stable 5-to 7-membered monocyclic or bicyclic or 7-to 10-membered bicyclic heterocyclic ring which is saturated, partially unsaturated or unsaturated (aromatic), and which consists of carbon atoms and from 1 to 4 heteroatoms independently selected from the group consisting of N, O and S and including any bicyclic group in which any of the above-defined heterocyclic rings is fused to a benzene ring. The term heteroaryl indicates that the group contains at least 1 aromatic ring. The nitrogen and sulfur heteroatoms may optionally be oxidized. The heterocyclic ring may be attached to its pendant group at any heteroatom or carbon atom that results in a stable structure. The heterocyclic rings

described herein may be substituted on carbon or on a nitrogen atom if the resulting compound is stable. A nitrogen in the heterocycle may optionally be quaternized.

It is preferred that when the total number of S and O atoms in the heterocycle exceeds 1, then these heteroatoms are not adjacent to one another. It is preferred that the total number of S and O atoms in the heterocycle is not more than 1, 2, or 3, more typically 1 or 2. It is preferred that the total number of S and O atoms in the aromatic heterocycle is not more than 1.

Examples of heteroaryl groups and other heterocycles include, but are not limited to, acridinyl, azocinyl, benzimidazolyl, benzofuranyl, benzothiofuranyl, benzothiophenyl, benzoxazolyl, benzthiazolyl, benztriazolyl, benztetrazolyl, benzisoxazolyl, benzisothiazolyl, benzimidazolyl, carbazolyl, NH-carbazolyl, carbolinyl, chromanyl, chromenyl, cinnolyl, decahydroquinolyl, 2*H*,6*H*-1,5,2-dithiazinyl, dihydrofuro[2,3-*b*]tetrahydrofuran, furanyl, furazanyl, imidazolidinyl, imidazolyl, imidazolyl, 1*H*-indazolyl, indolenyl, indolyl, indolizyl, indolyl, 3*H*-indolyl, isobenzofuranyl, isochromanyl, isoindazolyl, isoindolyl, isoquinolyl, isothiazolyl, isoxazolyl, morpholyl, naphthyridinyl, octahydroisoquinolyl, oxadiazolyl, 1,2,3-oxadiazolyl, 1,2,4-oxadiazolyl;- 1,2,5-oxadiazolyl, 1,3,4-oxadiazolyl, oxazolidinyl, oxazolyl, oxazolidinyl, pyrimidinyl, phenanthridinyl, phenanthrolinyl, phenazinyl, phenothiazinyl, phenoxathiinyl, phenoxazinyl, phthalazinyl, piperazinyl, piperidinyl, pteridinyl, purinyl, pyranyl, pyrazinyl, pyrazolidinyl, pyrazolyl, pyrazolyl, pyridazinyl, pyridooxazole, pyridoimidazole, pyridothiazole, pyridinyl, pyridyl, pyrimidinyl, pyrrolidinyl, pyrrolinyl, 2*H*-pyrrolyl, pyrrolyl, quinazolyl, quinolyl, 4*H*-quinolizyl, quinoxalyl, quinuclidinyl, tetrahydrofuranyl, tetrahydroisoquinolyl, tetrahydroquinolyl, 6*H*-1,2,5-thiadiazinyl, 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,2,5-thiadiazolyl, 1,3,4-thiadiazolyl, thianthrenyl, thiazolyl, thienyl, thienothiazolyl, thienooxazolyl, thienoimidazolyl, thiophenyl, triazinyl, 1,2,3-triazolyl, 1,2,4-triazolyl, 1,2,5-triazolyl, 1,3,4-triazolyl, and xanthenyl.

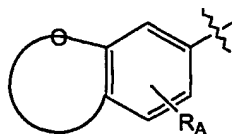
Preferred heteroaryl groups include, but are not limited to, pyridinyl,

pyrimidinyl, furanyl, and thienyl. Also included are fused ring and spiro compounds containing, for example, the above heterocycles.

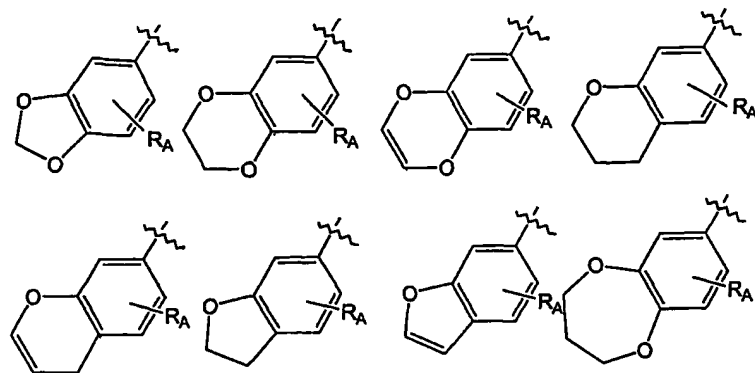
The term "halogen" indicates fluorine, chlorine, bromine, or iodine.

The term "pharmaceutically acceptable salts" includes, but is not limited to non-toxic salts with inorganic acids such as hydrochloride, sulfate, phosphate, diphosphate, hydrobromide, and nitrite or salts with an organic acids such as malate, maleate, fumarate, tartrate, succinate, citrate, acetate, lactate, methanesulfonate, p-toluenesulfonate, 2-hydroxyethylsulfonate, salicylate and stearate. Similarly, pharmaceutically acceptable cations include, but are not limited to sodium, potassium, calcium, aluminum, lithium and ammonium. The present invention also encompasses the prodrugs of the compounds disclosed.

Examples of bicyclic oxygen containing groups of the formula:



(R<sub>A</sub> may also be indicated R<sub>B</sub>) include the following:



### **Methods of Treating Patients**

The present invention provides methods of treating patients suffering from diseases or disorders involving pathologic activation of C5a receptors. Such diseases and disorders may include the following.

Such disorders that may be autoimmune in nature and are suitable for



treatment in accordance with the present invention include e.g. rheumatoid arthritis, systemic lupus erythematosus (and associated glomerulonephritis), psoriasis, Crohn's disease, vasculitis, irritable bowel syndrome, dermatomyositis, multiple sclerosis, bronchial asthma, pemphigus, pemphigoid, scleroderma, myasthenia gravis, autoimmune hemolytic and thrombocytopenic states, Goodpasture's syndrome (and associated glomerulonephritis and pulmonary hemorrhage), and immunovascularitis. Such inflammatory and related conditions include neutropenia, sepsis, septic shock, Alzheimer's disease, stroke, inflammation associated with severe burns, lung injury, myocardial infarction, coronary thrombosis, vascular occlusion, post-surgical vascular reocclusion, atherosclerosis, traumatic central nervous system injury and ischemic heart disease, and ischemia-reperfusion injury, as well as acute (adult) respiratory distress syndrome (ARDS), systemic inflammatory response syndrome (SIRS), multiple organ dysfunction syndrome (MODS), tissue graft rejection, and hyperacute rejection of transplanted organs. Also included are pathologic sequelae associated with insulin-dependent diabetes mellitus (including diabetic retinopathy), lupus nephropathy, Heyman nephritis, membranous nephritis and other forms of glomerulonephritis, contact sensitivity responses, and inflammation resulting from contact of blood with artificial surfaces that can cause complement activation, as occurs, for example, during extracorporeal circulation of blood (e.g., during hemodialysis or via a heart-lung machine, for example, in association with vascular surgery such as coronary artery bypass grafting or heart valve replacement) such as extracorporeal post-dialysis syndrome, or in association with contact with other artificial vessel or container surfaces (e.g., ventricular assist devices, artificial heart machines, transfusion tubing, blood storage bags, plasmapheresis, plateletpheresis, and the like).

Treatment methods of the invention include in general administration to a patient a therapeutically effective amount of one or more compounds of the invention. Suitable patients include those subjects suffering from or susceptible to (i.e. prophylactic treatment) a disorder or disease identified herein. Typical patients

for treatment in accordance with the invention include mammals, particularly primates, especially humans. Other suitable subjects include domesticated companion animals such as a dog, cat, horse, and the like, or a livestock animal such as cattle, pig, sheep and the like.

#### **Pharmaceutical Preparations**

The compounds of the invention may be administered orally, topically, parenterally, by inhalation or spray or rectally in dosage unit formulations containing conventional non-toxic pharmaceutically acceptable carriers, adjuvants and vehicles. Oral administration in the form of a pill, capsule, elixir, syrup, lozenge, troche, or the like is particularly preferred. The term parenteral as used herein includes injections and the like, such as subcutaneous, intradermal, intravascular (e.g., intravenous), intramuscular, intrasternal, spinal, intrathecal, and like injection or infusion techniques, with subcutaneous, intramuscular and intravascular injections or infusions being preferred. In addition, there is provided a pharmaceutical formulation comprising a compound of the invention and a pharmaceutically acceptable carrier. One or more compounds of the invention may be present in association with one or more non-toxic pharmaceutically acceptable carriers and/or diluents and/or adjuvants and if desired other active ingredients. The pharmaceutical compositions containing compounds of the invention may be in a form suitable for oral use, for example, as tablets, troches, lozenges, aqueous or oily suspensions, dispersible powders or granules, emulsion, hard or soft capsules, or syrups or elixirs.

Compositions intended for oral use may be prepared according to any method known to the art for the manufacture of pharmaceutical compositions and such compositions may contain one or more agents selected from the group consisting of sweetening agents, flavoring agents, coloring agents and preserving agents in order to provide pharmaceutically elegant and palatable preparations. Tablets contain the active ingredient in admixture with non-toxic pharmaceutically acceptable excipients that are suitable for the manufacture of tablets. These

excipients may be for example, inert diluents, such as calcium carbonate, sodium carbonate, lactose, calcium phosphate or sodium phosphate; granulating and disintegrating agents, for example, corn starch, or alginic acid; binding agents, for example starch, gelatin or acacia, and lubricating agents, for example magnesium stearate, stearic acid or talc. The tablets may be uncoated or they may be coated by known techniques to delay disintegration and absorption in the gastrointestinal tract and thereby provide a sustained action over a longer period. For example, a time delay material such as glyceryl monostearate or glyceryl distearate may be employed.

Formulations for oral use may also be presented as hard gelatin capsules wherein the active ingredient is mixed with an inert solid diluent, for example, calcium carbonate, calcium phosphate or kaolin, or as soft gelatin capsules wherein the active ingredient is mixed with water or an oil medium, for example peanut oil, liquid paraffin or olive oil.

Aqueous suspensions contain the active materials in admixture with excipients suitable for the manufacture of aqueous suspensions. Such excipients are suspending agents, for example sodium carboxymethylcellulose, methylcellulose, hydropropylmethylcellulose, sodium alginate, polyvinylpyrrolidone, gum tragacanth and gum acacia; dispersing or wetting agents may be a naturally-occurring phosphatide, for example, lecithin, or condensation products of an alkylene oxide with fatty acids, for example polyoxyethylene stearate, or condensation products of ethylene oxide with long chain aliphatic alcohols, for example heptadecaethyleneoxycetanol, or condensation products of ethylene oxide with partial esters derived from fatty acids and a hexitol such as polyoxyethylene sorbitol monooleate, or condensation products of ethylene oxide with partial esters derived from fatty acids and hexitol anhydrides, for example polyethylene sorbitan monooleate. The aqueous suspensions may also contain one or more preservatives, for example ethyl, or n-propyl p-hydroxybenzoate, one or more coloring agents, one or more flavoring agents, and one or more sweetening agents, such as sucrose or saccharin.

Oily suspensions may be formulated by suspending the active ingredients in a vegetable oil, for example arachis oil, olive oil, sesame oil or coconut oil, or in a mineral oil such as liquid paraffin. The oily suspensions may contain a thickening agent, for example beeswax, hard paraffin or cetyl alcohol. Sweetening agents such as those set forth above, and flavoring agents may be added to provide palatable oral preparations. These compositions may be preserved by the addition of an anti-oxidant such as ascorbic acid.

Dispersible powders and granules suitable for preparation of an aqueous suspension by the addition of water provide the active ingredient in admixture with a dispersing or wetting agent, suspending agent and one or more preservatives. Suitable dispersing or wetting agents and suspending agents are exemplified by those already mentioned above. Additional excipients, for example sweetening, flavoring and coloring agents, may also be present.

Pharmaceutical compositions of the invention may also be in the form of oil-in-water emulsions. The oily phase may be a vegetable oil, for example olive oil or arachis oil, or a mineral oil, for example liquid paraffin or mixtures of these. Suitable emulsifying agents may be naturally-occurring gums, for example gum acacia or gum tragacanth, naturally-occurring phosphatides, for example soy bean, lecithin, and esters or partial esters derived from fatty acids and hexitol, anhydrides, for example sorbitan monoleate, and condensation products of the said partial esters with ethylene oxide, for example polyoxyethylene sorbitan monoleate. The emulsions may also contain sweetening and flavoring agents.

Syrups and elixirs may be formulated with sweetening agents, for example glycerol, propylene glycol, sorbitol or sucrose. Such formulations may also contain a demulcent, a preservative and flavoring and coloring agents. The pharmaceutical compositions may be in the form of a sterile injectable aqueous or oleaginous suspension. This suspension may be formulated according to the known art using those suitable dispersing or wetting agents and suspending agents which have been mentioned above. The sterile injectable preparation may also be sterile injectable solution or suspension in a non-toxic parentally acceptable diluent or solvent, for

example as a solution in 1,3-butanediol. Among the acceptable vehicles and solvents that may be employed are water, Ringer's solution and isotonic sodium chloride solution. In addition, sterile, fixed oils are conventionally employed as a solvent or suspending medium. For this purpose any bland fixed oil may be employed including synthetic mono-or diglycerides. In addition, fatty acids such as oleic acid find use in the preparation of injectables.

The compounds of the invention may also be administered in the form of suppositories e.g., for rectal administration of the drug. These compositions can be prepared by mixing the drug with a suitable non-irritating excipient that is solid at ordinary temperatures but liquid at the rectal temperature and will therefore melt in the rectum to release the drug. Such materials are cocoa butter and polyethylene glycols.

Compounds of the invention may be administered parenterally, preferably in a sterile non-toxic, pyrogen-free medium. The drug, depending on the vehicle and concentration used, can either be suspended or dissolved in the vehicle. Advantageously, adjuvants such as local anesthetics, preservatives and buffering agents can be dissolved in the vehicle.

Dosage levels of the order of from about 0.1 mg to about 140 mg per kilogram of body weight per day are useful in the treatment or preventions of conditions involving pathogenic C5a activity, particularly those disorders list in the "background of the invention" section (about 0.5 mg to about 7 g per patient per day). The amount of active ingredient that may be combined with the carrier materials to produce a single dosage form will vary depending upon the host treated and the particular mode of administration. Dosage unit forms will generally contain between from about 1 mg to about 500 mg of an active ingredient.

Frequency of dosage may also vary depending on the compound used and the particular disease treated. However, for treatment of most disorders, a dosage regimen of 4 times daily, three times daily, or less is preferred, with a dosage regimen of once daily or 2 times daily being particularly preferred.

It will be understood, however, that the specific dose level for any particular patient will depend upon a variety of factors including the activity of the specific compound employed, the age, body weight, general health, sex, diet, time of administration, route of administration, and rate of excretion, drug combination (i.e., other drugs being administered to the patient), the severity of the particular disease undergoing therapy, and other factors, including the judgment of the prescribing medical practitioner.

Preferred compounds of the invention will have favorable pharmacological properties. Such properties include, but are not limited to bioavailability (e.g., oral bioavailability, preferably high enough to permit oral administration of doses of less than 2 grams, preferably of less than or equal to one gram), low toxicity, low serum protein binding and desirable *in vitro* and *in vivo* half-lives. Distribution in the body to sites of complement activity is also desirable, e.g., compounds used to treat CNS disorders will preferably penetrate the blood brain barrier, while low brain levels of compounds used to treat peripheral disorders are typically preferred.

Assays may be used to predict these desirable pharmacological properties. Assays used to predict bioavailability include transport across human intestinal cell monolayers, including Caco-2 cell monolayers. Toxicity to cultured hepatocytes may be used to predict compound toxicity. Penetration of the blood brain barrier of a compound in humans may be predicted from the brain levels of the compound in laboratory animals given the compound intravenously.

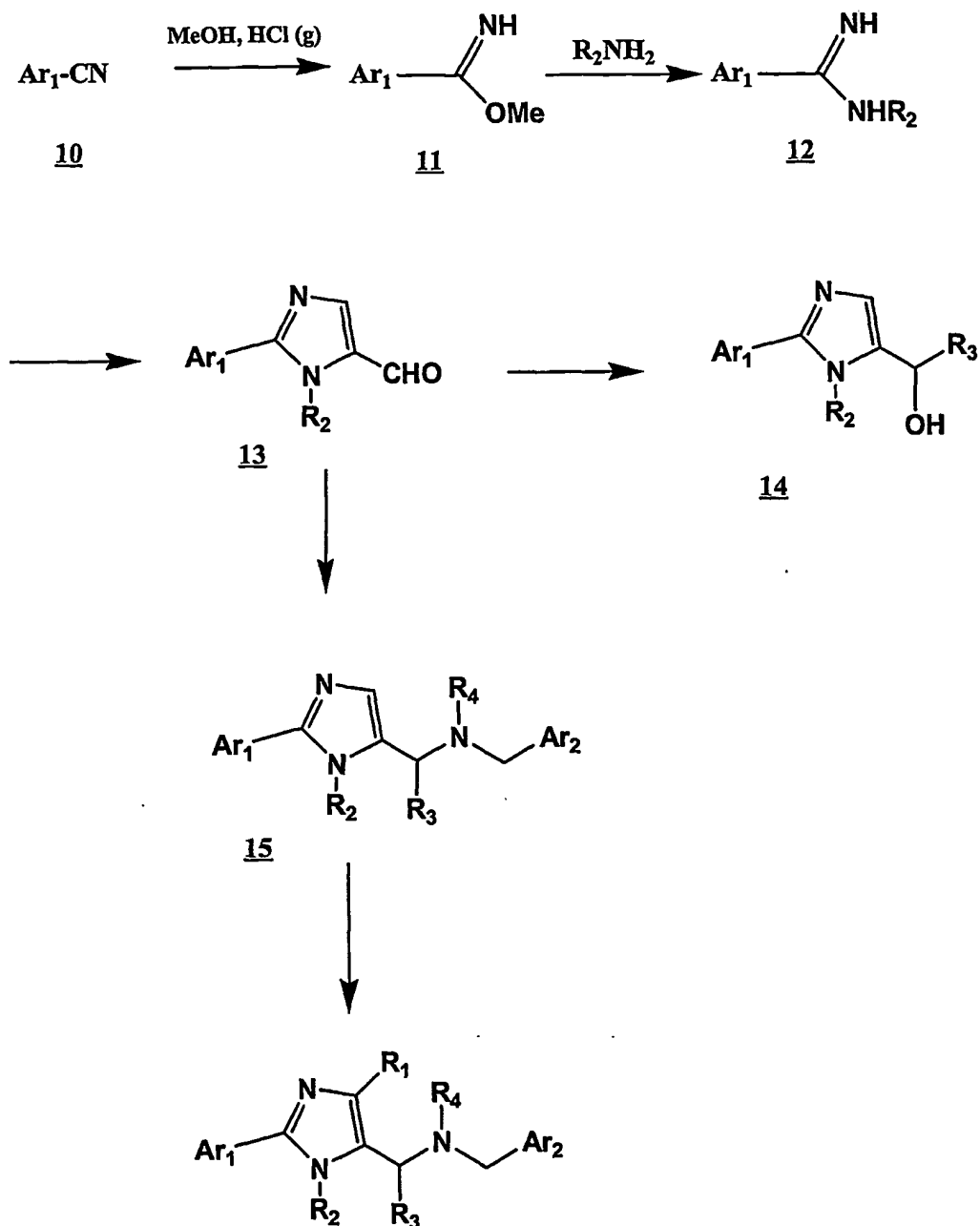
Serum protein binding may be predicted from albumin binding assays. Such assays are described in a review by Oravcová, et al. (Journal of Chromatography B (1996) volume 677, pages 1-27).

Compound half-life is inversely proportional to the frequency of dosage required for the effective administration of a compound. *In vivo* half-lives of compounds may be predicted, e.g., from assays of microsomal half-life as described by Kuhnz and Gieschen (Drug Metabolism and Disposition, (1998) volume 26, pages 1120-1127).

**Preparation of compounds**

Representative methods for preparing the compounds of the invention are shown in the following Schemes. Schemes 1 and 2 show the preparation of arylimidazole compounds. Scheme 1 illustrates the preparation of arylimidazole compounds where R<sub>1</sub> is hydrogen or halogen. Scheme 2 represents of the preparation of aryl imidazole compounds where R<sub>1</sub> is alkyl. Within Schemes 1 and 2 the variables Ar<sub>1</sub>, Ar<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> ~ are defined as above for Formula I.

Scheme 1. Synthesis of 1-Alkyl-2-aryl-5-aminomethylimidazoles



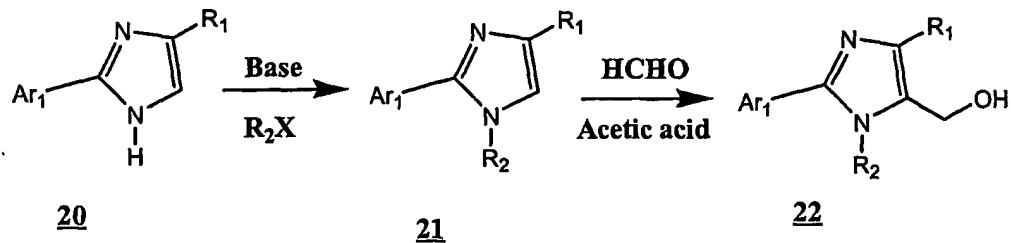
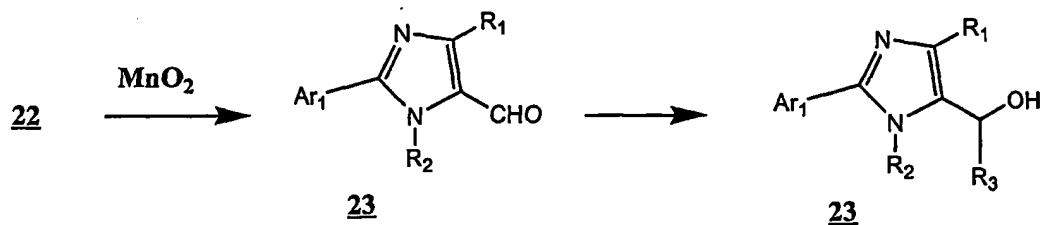
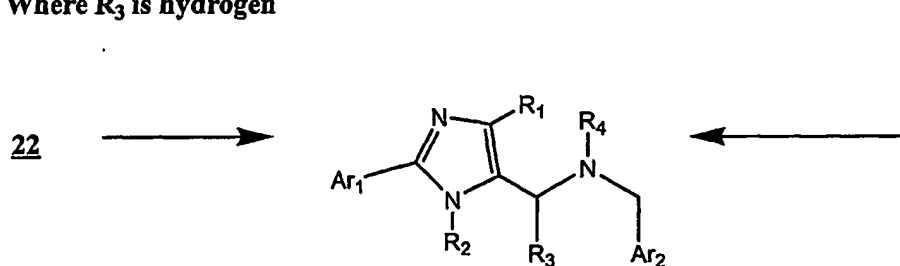
As shown in Scheme 1, an appropriately substituted aryl nitrile **10** is converted to the imidate **11** via treatment with hydrogen chloride gas in methanol followed by subsequent treatment with base to release the free base. Amidine **12** is prepared from **11** by treatment with a primary amine. 2-Arylimidazole-4-carboxaldehyde **13** is prepared from **12** by one of several methods described in the chemical literature,



for instance, by treatment with 2-bromo-3-isopropoxyacrolein in the presence of base. See, for example, *J. Org. Chem.*, **62**: 8449 (Shilcrat et al., 1997).

Aldehyde **13** can then be transformed into hydroxymethylimidazole **14** either by reduction (for cases where R<sub>4</sub> is hydrogen) or by treatment with the appropriate organometallic (for cases where R<sub>4</sub> is C1-C6 alkyl). The hydroxy group of **14** is converted to either a halogen or sulfonate ester leaving group. Treatment of this intermediate with an appropriate secondary amine in the presence of base provides 2-aryl-4-aminomethylimidazole **15**. Alternatively, the aminoalkyl functionality of **15** may be elaborated by sequential amination-acylation-reduction steps. In situations where R<sub>1</sub> is a halogen, it may be prepared from **15** (R<sub>1</sub>=H) by treatment with the molecular halogen, a halosuccinimide or the like.

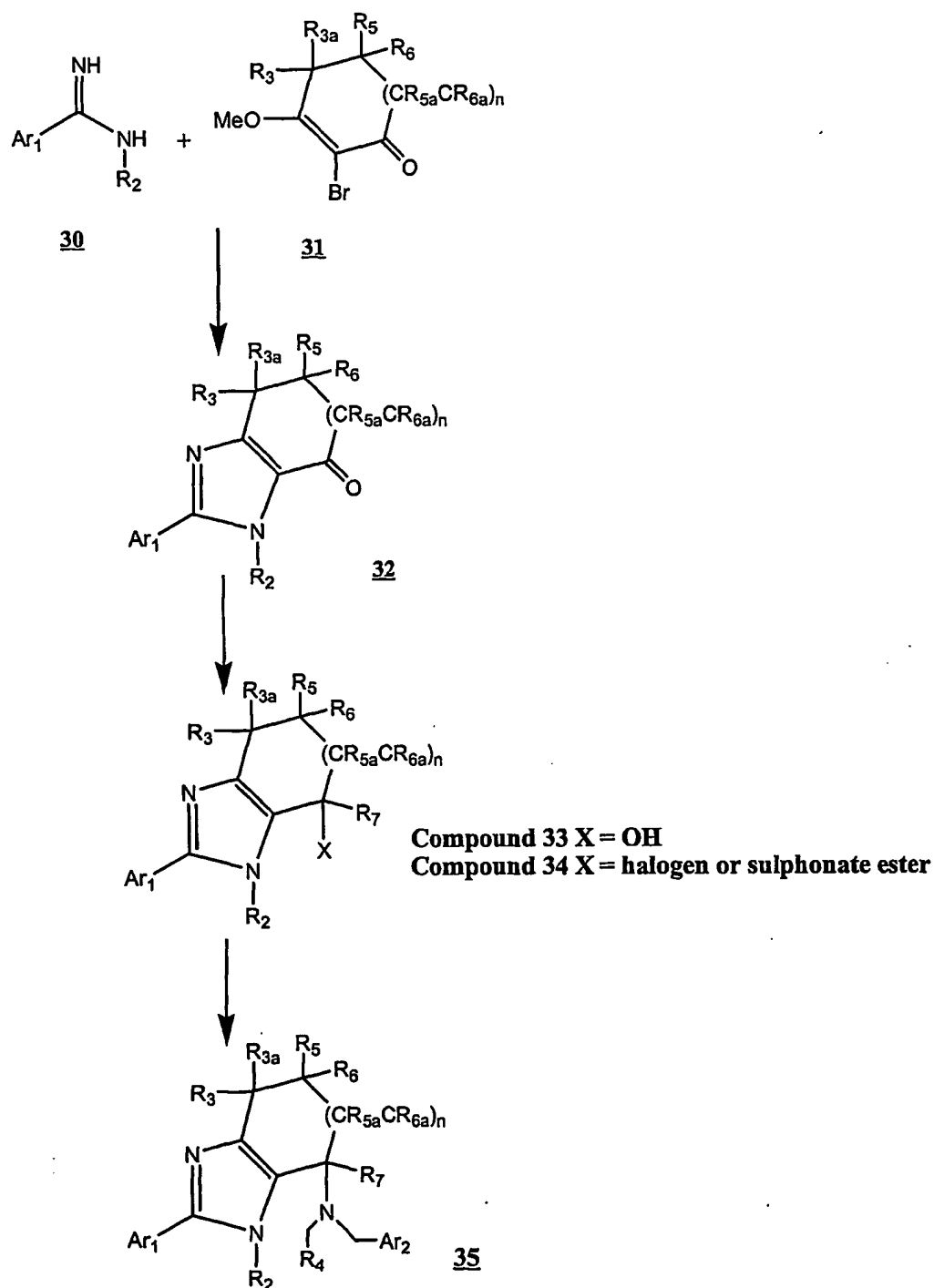
As shown in Scheme 2, an appropriately substituted 2-aryl-4-substitutedimidazole **20** can be N-alkylated by treatment with base such as sodium hydride and an alkyl halide or alkylsulfonate ester to provide the trisubstituted imidazole **21**. Hydroxymethylation of **21** under the conditions of the Mannich reaction provides hydroxymethylimidazole **22**. In examples where R<sub>3</sub> is alkyl, hydroxymethyl derivative **24** is prepared from **22** by oxidation to aldehyde **23** and subsequent treatment with an appropriate organometallic reagent such as an alkyl lithium or Grignard reagent. Conversion of **22** or **24** to the desired 2-aryl-5-aminomethylimidazoles is carried out by conversion of the hydroxymethyl to a halogen or sulfonate ester leaving group followed by treatment with a secondary amine. Alternatively, the aminoalkyl functionality of the 2-aryl-5-aminomethylimidazole product may be elaborated by sequential amination-acylation-reduction steps.

**Scheme 2. Synthesis of 2-Arylimidazoles**Where  $R_2$  is alkyl:Where  $R_3$  is alkyl:Where  $R_3$  is hydrogen

The 2-aryl-4-substitutedimidazole **20** may be prepared by methods described in the chemical literature, for instance, via condensation of an arylamidine with a halomethyl or hydroxymethyl ketone.

**Cycloalkylimidazoles**

An illustration of the preparation of compounds of the Cycloalkylimidazole compounds of the present invention is given in Scheme 3. Within Scheme 3 the variables  $n$ ,  $Ar_1$ ,  $Ar_2$ ,  $R_2$ ,  $R_3$ ,  $R_{3a}$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_{5a}$ ,  $R_{6a}$ ,  $R_7$  and  $X$  are defined previously.

**Scheme 3. Preparation of Cycloalkylimidazoles**

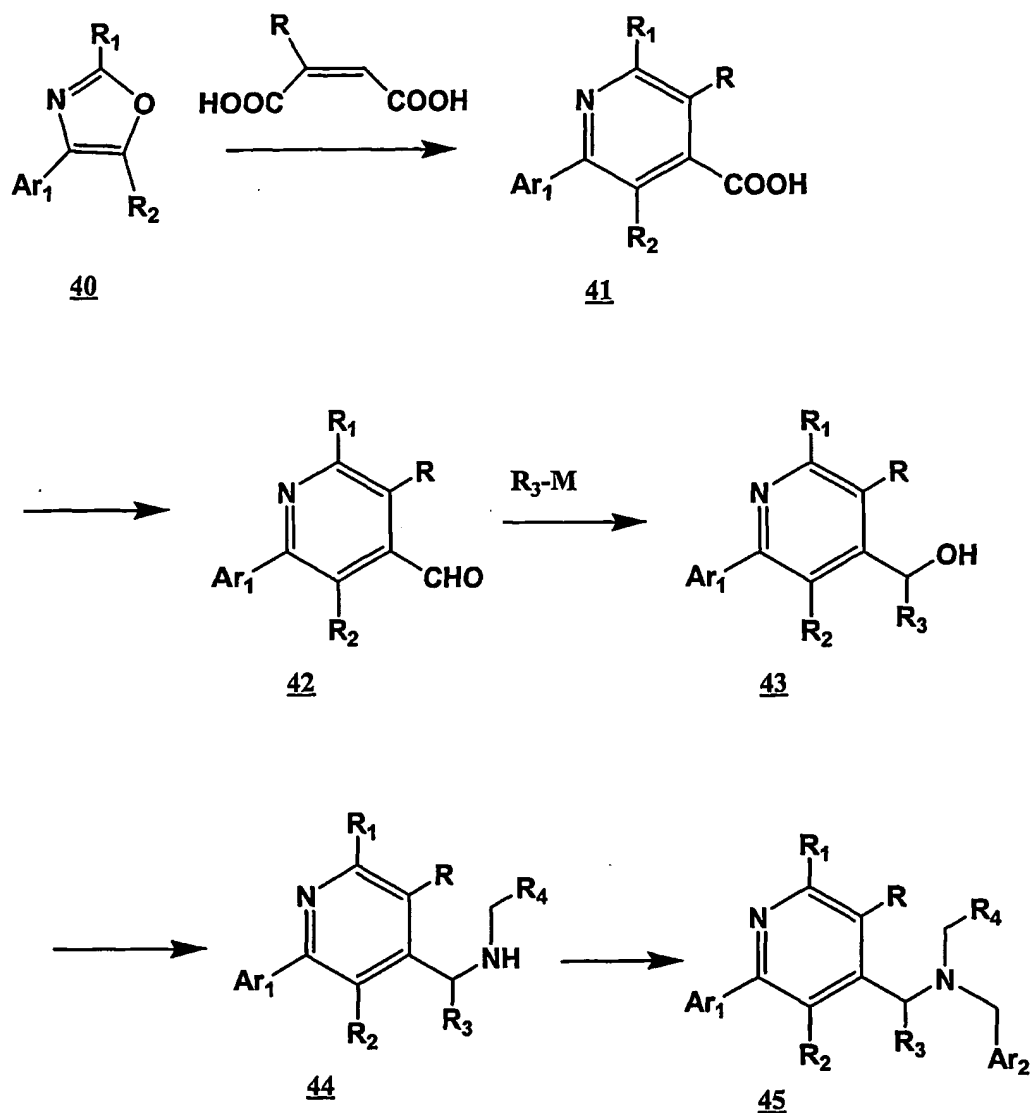
As shown in Scheme 3, an appropriately substituted arylamidine **30** is condensed with an appropriately substituted 2-halo-3-alkoxyenone **31** to provide a 2-aryl-4,5-

cycloalkylimidazole **32**. The ketone functionality of **32** can be either reduced ( $R_7 = H$ ) or treated with an appropriate organometallic (for cases where  $R_7$  is alkyl) to give the cyclic alcohol **33**. Compounds of general formula **34** can be prepared from **33** by one of several methods described in the chemical literature, for instance, by treatment with thionyl chloride or by treatment with an alkyl or arylsulphonyl chloride in the presence of base.

Compounds of formula **34** can then be transformed into compounds of general Formula **35** by direct treatment with the appropriate secondary amine. Alternatively, the X functionality of **34** may be transformed into a tertiary amine in a stepwise manner. In this case, **34** would be treated with a primary amine to provide an intermediate secondary amine. This, in turn, could be alkylated to give cycloalkylimidazole compounds of the invention.

### **Pyridines**

An illustration of the preparation of pyridine compounds of the present invention is given in Scheme 4. Those having skill in the art will recognize that the starting materials may be varied and additional steps employed to produce compounds encompassed by the present invention. Within Scheme 4 the variables  $Ar_1$ ,  $Ar_2$ ,  $R$ ,  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  are defined as previously described.

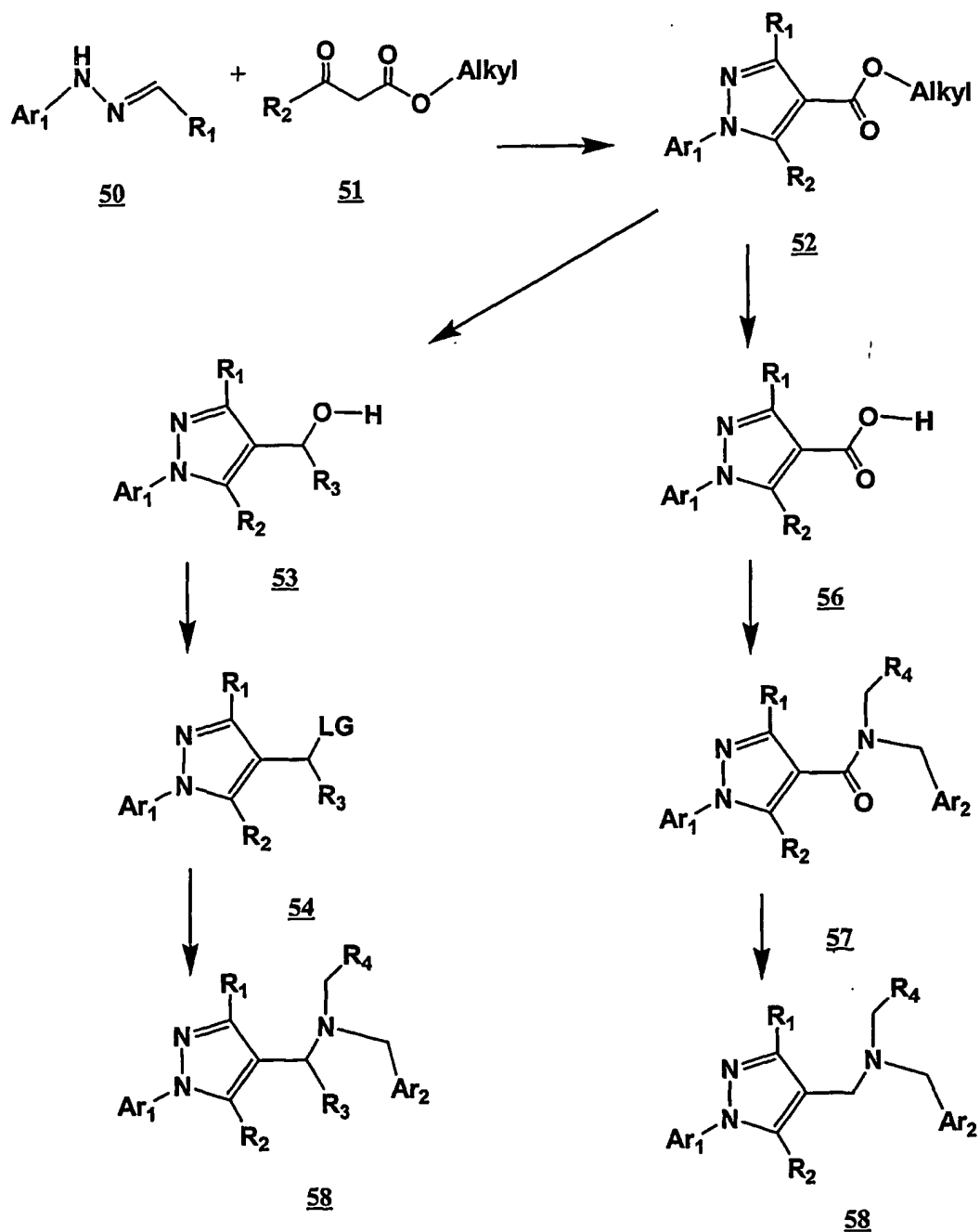
**Scheme 4. Preparation of Aryl pyridines**

As shown in Scheme 4, an appropriately substituted 4-phenyloxazole **40** is condensed with an appropriately substituted maleic acid to provide a 2-phenylisonicotinic acid **41**. The carboxylic acid functionality of **41** can be reduced directly to the primary alcohol (**43**,  $R_3 = H$ ) or converted by methods known to the art to an intermediate aldehyde **42** and subsequently treated with the appropriate organometallic (for cases where  $R_3$  is alkyl) to give a secondary alcohol **43**. Compounds of general formula **44** can be prepared from **43** by one of several

methods described in the chemical literature, for instance, by initial treatment with thionyl chloride or with an alkyl or arylsulphonyl chloride in the presence of base, followed by subsequent condensation with a primary amine. Compounds of formula **44** can then be transformed into compounds of formula **45** by direct treatment with the appropriate alkylating agent or, alternatively, by reductive alkylation. Alternatively, the tertiary amine functionality of formula **45** may be realized directly from compounds of formula **43** by initial treatment with thionyl chloride or with an alkyl or arylsulphonyl chloride in the presence of base, followed by subsequent condensation with a secondary amine.

### **Pyrazoles**

An illustration of the preparation of arylpyrazole compounds of the present invention is given in Scheme 5. Within Scheme 5 the variables Ar<sub>1</sub>, Ar<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are defined as previously described.

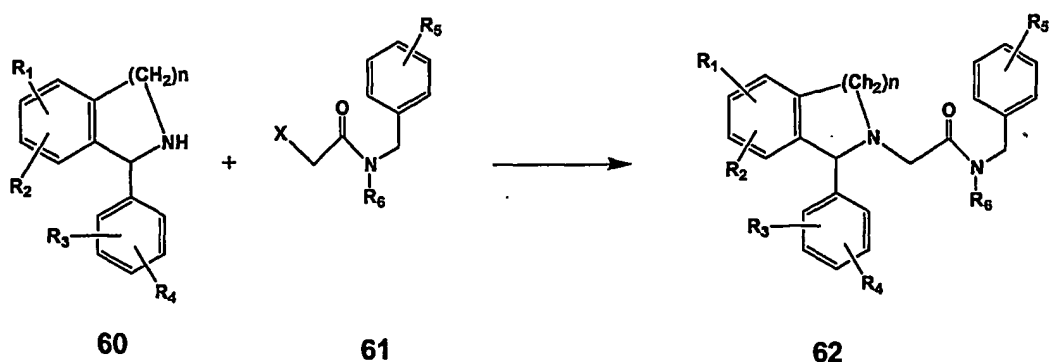
**Scheme 5. Preparation of Arylpyrazoles**

As shown in Scheme 5, an appropriately substituted phenylhydrazine adduct **50** is condensed with an appropriately substituted  $\alpha$ -ketoester **51**, in the presence of a Lewis acid, preferably  $\text{ZnCl}_2$ , with heating at 50 – 200 °C, preferably at 125 °C to provide a 1-phenylpyrazole ester **52**. The carboxylic acid functionality of **52** can be reduced directly to the primary alcohol (**53**,  $\text{R}_3 = \text{H}$ ) or converted by methods known

to the art to an intermediate aldehyde and subsequently treated with the appropriate organometallic (for cases where  $R_3$  is alkyl) to give a secondary alcohol **53**. Compounds of general formula **54**, where LG represents a leaving group, can be prepared from **53** by one of several methods described in the chemical literature, for instance, by initial treatment with thionyl chloride or with an alkyl or arylsulphonyl chloride in the presence of base, followed by subsequent condensation with a primary amine. Compounds of formula **54** can then be transformed into compounds of formula **58** by sequential treatment with the appropriate primary amine followed by direct alkylation or reductive alkylation of the intermediate secondary amine. Alternatively, the tertiary amine functionality of formula **58** may be realized directly from compounds of formula **53** by initial treatment with thionyl chloride or with an alkyl or arylsulphonyl chloride in the presence of base, followed by subsequent condensation with a secondary amine.

An alternative route to the preparation of compounds of Formula **58** from the 1-phenylpyrazole ester **52** may be realized by hydrolysis of **52** to a carboxylic acid of general structure **56**, followed by amide formation to provide **57** and, finally, reduction of the amide functionality to the tertiary amine of **58** ( $R_3=H$ ).

Scheme 6. Preparation of 2-(1-aryl-1,2,3,4-tetrahydroisoquinolin-2-yl) acetamides and bicyclics of other ring sizes ( $n=0, 1, 2, 3$ , etc)



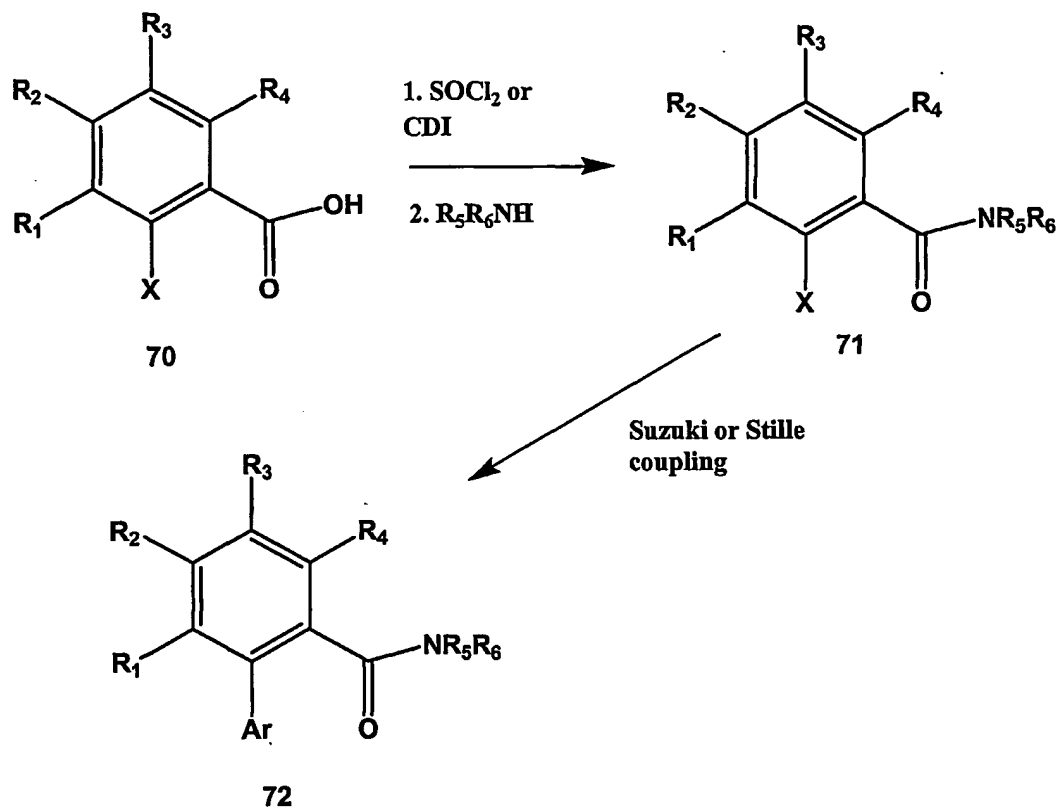
The 2-(1,2,3,4-tetrahydroisoquinolin-2-yl) acetamides of general formula **62** of the present invention may be prepared according to the procedure described



graphically in Scheme 6, wherein a compound of general Formula **60**, prepared according to literature procedures, (for example: Scully, Frank E., Jr.; Schlager, John J. Synthesis of dihydroisoquinolines and 1-substituted tetrahydroisoquinolines. Heterocycles (1982), 19(4), 653-6 or Shinohara, Tatsumi; Takeda, Akira; Toda, Jun; Terasawa, Noriyo; Sano, Takehiro. A highly efficient synthesis of 1-methyl-, 1-benzyl-, and 1-phenyl-1,2,3,4-tetrahydroisoquinolines by a modified Pummerer reaction. Heterocycles (1997), 46: 555-566.) is combined (in an appropriate solvent in the presence of an organic or inorganic base) with an appropriately substituted acetamide derivative possessing a leaving group X at its 2 position. For example, X may be halogen, alkyl or aryl sulfonate, or polyfluoroalkylsulfonate. Acetamides of general Formula **61** may be prepared via condensation of the appropriate secondary amine with a 2-haloacetylhalide (such as 2-chloroacetyl chloride) in the presence of base. Alternatively acetamides of general formula **61** can be prepared by condensation of the appropriate secondary amine with either a 2-(alkylsulfonylester)acetic acid or 2-(arylsulfonylester)acetic acid in the presence of an coupling agent such as CDI or the like.

Within Scheme 6, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> may be the same or different and are chosen from hydrogen, halogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, hydroxy, trifluoromethyl, trifluoromethoxy, cyano, nitro, hydroxy carbonyl (COOH), aminocarbonyl (CONH<sub>2</sub>), mono or dialkylaminocarbonyl, sulfonamido, mono or dialkylsulfonamido, amino, mono- or di-alkylamino, aceto, acetoxy or 3,4-methylenedioxy or ethylenedioxy. The term n refers to an integer from 1 to 3. R<sub>6</sub> may be C<sub>1</sub>-C<sub>9</sub> straight or branched chain alkyl, benzyl (substituted or unsubstituted), phenylethyl (substituted or unsubstituted), phenylpropyl (substituted or unsubstituted), or may be cycloalkyl fused with an aromatic group such as 1,2,3,4-tetrahydronaphthyl, 1- or 2- indanyl or suberanyl.

#### Scheme 7. Preparation of Ortho BiarylAmides



The preparation of the ortho biaryl amides of the present invention may be carried out via a series of chemical transformations similar to those displayed graphically in Scheme 7. An individual skilled in the art may find modifications of one or several of the synthetic steps described herein without diverting significantly from the overall synthetic scheme.

Thus, as shown, the synthetic route begins with a benzoic acid of general structure 70 possessing a group  $X$  at the ortho position. This  $X$  group may be iodine, bromine, chlorine, sulfonate ester or polyfluoroalkylsulfonate ester. The benzoic acid may also be substituted by up to four independently chosen substituents represented by the variables  $R_1$ - $R_4$ . Examples of suitable substituents include hydrogen, chlorine, fluorine, cyano,  $\text{C}_1$ - $\text{C}_6$  straight or branched chain alkyl,  $\text{C}_1$ - $\text{C}_6$  straight or branched chain alkoxy, trifluoromethyl, trifluoromethoxy, nitro, amino, mono or dialkyl amino, sulfonamido, mono or dialkylsulfonamido, alkylthio e.g. methylthio, alkylsulfoxide, alkylsulfone, acetyl, acetoxy, alkoxycarbonyl

(COOAlkyl) or dialkylaminocarbonyl (CON[alkyl]<sub>2</sub>). Additionally, two adjacent groups (i.e R<sub>1</sub> and R<sub>2</sub>, or R<sub>2</sub> and R<sub>3</sub> or R<sub>3</sub> and R<sub>4</sub>) may be taken together with a chain of from 3 to 5 methylene carbons to form a alkyl ring of from five to seven carbons fused to the benzoic acid moiety. Additionally, two adjacent groups (i.e R<sub>1</sub> and R<sub>2</sub>, or R<sub>2</sub> and R<sub>3</sub> or R<sub>3</sub> and R<sub>4</sub>) may be taken together with an alkyloxy chain, for example OCH<sub>2</sub>O or OCH<sub>2</sub>CH<sub>2</sub>O to form an oxygen-containing moiety (in this example methylenedioxy or ethylenedioxy, respectively) fused to the benzoic acid.

This benzoic acid is then activated by conversion to an acid chloride with thionyl chloride, oxalyl chloride or the like. Alternatively, it may be activated by treatment with carbonyldiimidazole or a similar agent. The activated benzoic acid is then treated with an appropriate secondary amine in the presence of base to provide a tertiary amide of general structure 71.

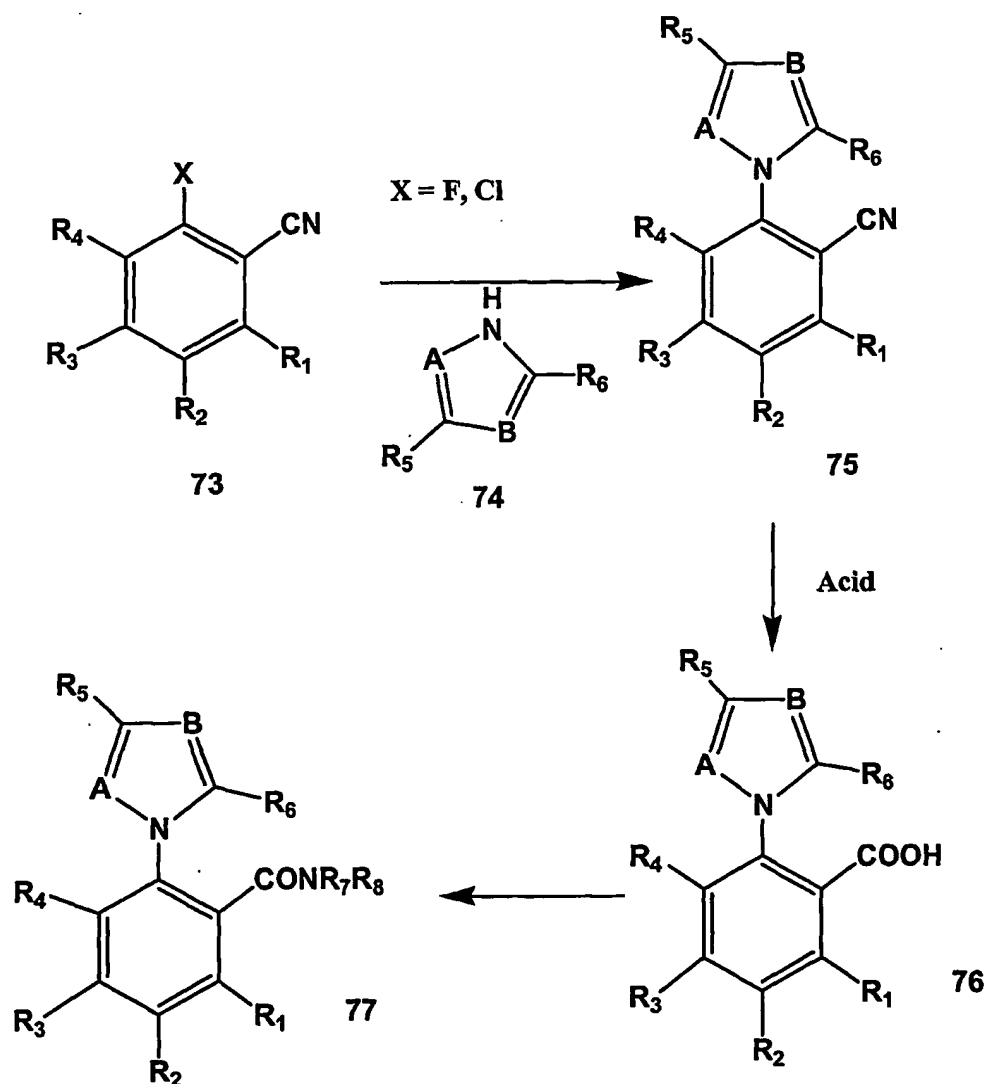
Amide 71 is then converted to the biaryl structure 72 through the use of aryl coupling reactions know in the chemical literature. Examples of such reactions are the Stille reaction where an aryl trialkyltin reagent is coupled to an appropriate aryl in the presence of a catalyst such as palladium or nickel; or a Suzuki reaction where a arylboronic acid is coupled to an appropriate aryl in the presence of a nickel or palladium catalyst in the presence of base.

The group "Ar" of General structure 72 may be a phenyl which may be substituted with up to five additional independently chosen substituents, e.g. hydrogen, halogen, cyano, C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl, C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkoxy, trifluoromethyl, trifluoromethoxy, nitro, amino, mono or dialkyl amino, sulfonamido, mono or dialkylsulfonamido, alkylthio e.g. methylthio, alkylsulfoxide, alkylsulfone, acetyl, acetoxy, hydroxycarbonyl (COOH), alkoxycarbonyl (COOAlkyl), aminocarbonyl (CONH<sub>2</sub>), monoalkylaminocarbonyl, dialkylaminocarbonyl (CON[alkyl]<sub>2</sub>, methylenedioxy or ethylenedioxy.

The Ar of General Structure 72 may also represent a heteroaryl group such as 1- or 2- thienyl or 1- or 2- furanyl. Such a heteroaryl group which may be additionally substituted by up to three independently chosen substituents, such as hydrogen, halogen, cyano, C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl, C<sub>1</sub>-C<sub>6</sub> straight or

branched chain alkoxy, trifluoromethyl, trifluoromethoxy, dialkyl amino, sulfonamido, mono or dialkylsulfonamido, alkylthio e.g. methylthio, alkylsulfoxide, alkylsulfone, acetyl, acetoxy, hydroxycarbonyl (COOH), alkoxycarbonyl (COOAlkyl), aminocarbonyl (CONH<sub>2</sub>), monoalkylcarbonyl, dialkylaminocarbonyl (CON[alkyl]<sub>2</sub>).

Scheme 8. General Preparation of Azaaryl benzamides



The preparation of 2-imidazolyl, 2-pyrrazolyl and 2-(1,2,4)-triazolyl benzamides begins with an appropriately substituted benzonitrile derivative having a leaving group X at the position ortho to the carboxylic acid functionality. Most

commonly this group would be a fluorine or chlorine group. This benzonitrile may be optionally substituted or additionally substituted by up to four substituents ( $R_1$ - $R_4$ ) which may be the same or different (examples of such substituents are: hydrogen, halogen, cyano,  $C_1$ - $C_6$  straight or branched chain alkyl,  $C_1$ - $C_6$  straight or branched chain alkoxy, trifluoromethyl, trifluoromethoxy, nitro, amino, mono or dialkyl amino, sulfonamido, mono or dialkylsulfonamido, methylthio, alkylsulfoxide, alkylsulfone, acetyl, acetoxy, alkoxycarbonyl (COOAlkyl) or dialkylaminocarbonyl (CON[alkyl]<sub>2</sub>).

The benzonitrile **73** is mixed with the azaheterocycle **74** (wherein A and B may be either nitrogen or carbon with the caveat that both A and B not be carbon.  $R_5$  and  $R_6$  may be the same as those groups described for  $R_1$ - $R_4$ .) This condensation may be carried out either in a single phase system in an appropriate solvent and base, or in a two-phase manner using a phase transfer catalyst.

2-Azaheterocyclicbenzonitrile **75** is hydrolyzed to the corresponding benzoic acid **76** via means common to the chemical literature, for instance mineral acid.

The benzoic acid **76** is then activated via thionyl chloride, CDI or other means known to the chemical literature and condensed with an appropriately substituted secondary amine to provide the desired final products **77**.

### **EXAMPLES**

The general methods given in Schemes 1 to 8 above for the preparation of compounds of the present invention are further illustrated by the following examples. Specifically, the methods given in Schemes 1 and 2 for the preparation of aryl imidazoles are illustrated by Examples 1-4, shown below. An example of the method shown in Scheme 3 for the preparation of cycloalkylimidazoles is given in example 5, and example of the method shown in Scheme 4 for the preparation of arylpyridines is given in example 6, and an example of the method shown in Scheme 5 for the preparation of arylpyrazoles is given in example 7. The method shown by Scheme 6 for the preparations of 2-(1-Aryl-1,2,3,4-tetrahydroisoquinolin-2-yl)acetamides is further illustrated in example 8. The methods shown in Schemes 7

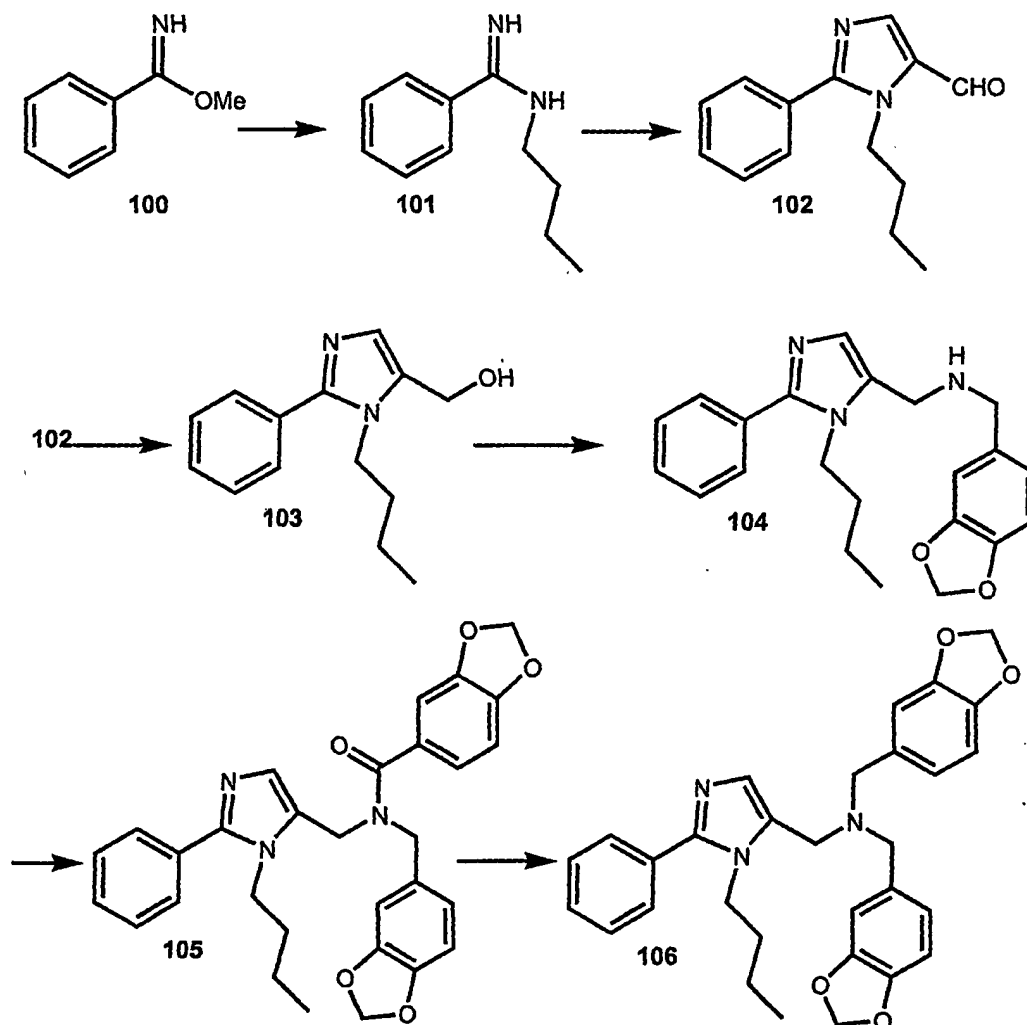
and 8 for the preparation of ortho biarylamides and azaarylamides, respectively, are exemplified in Examples 9 and 10. Unless otherwise specified all starting materials and reagents are of standard commercial grade, and are used without further purification, or are readily prepared from such materials by routine methods. Those skilled in the art of organic synthesis will recognize that starting materials and reaction conditions may be varied to achieve the desired end product.

Example 1. Preparation of an arylimidazole compound: 1-(1-butyl)-2-phenyl-5-(N,N-di[3,4-methylenedioxyphenyl methyl])aminomethylimidazole (Compound 106).

N-(n-butyl)-benzamidine (**101**). To a solution of methyl benzimidate hydrochloride (12 g, 0.07 mole) in dimethylformamide (DMF, 20 mL) is added 7 ml of triethylamine at 0 °C. After 2 h the reaction is filtered to remove triethylamine hydrochloride. To the filtrate is added 3.68 g of 1-butylamine and the mixture is heated to 60 °C for 6 h. After cooling the mixture is partitioned between ethyl acetate and water. The organic layer is washed with brine, dried over sodium sulfate and concentrated to provide 13.28 g of the amidine as a yellow oil. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.55 (m, 2H), 7.4 (m, 3H), 3.37 (bm, 2H), 1.62 (m, 2H), 1.42 (m, 2H), 0.95 (t, J = 7 Hz, 3H).

1-(1-Butyl)-2-phenylimidazole-5-carboxaldehyde (**102**). To a solution of **101** (13.28 g) and 2-bromo-3-isopropoxyacrolein (22 g) in chloroform (150 ml) is added potassium carbonate (15.5 g) and water (19 ml). The mixture is stirred at room temperature overnight. The aqueous layer is discarded and the organic layer is washed with water (3X 100 mL), dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated. The residue is purified via flash chromatography (5% MeOH/CHCl<sub>3</sub>) to provide the desired imidazole carboxaldehyde as a pale yellow oil (21.55 g). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 9.75 (s, 1H), 7.90 (s, 1H), 7.55 (m, 2H), 7.45 (m, 3H), 4.38 (t, J = 8Hz, 2H), 1.75 (m, 2H), 1.22 (m, 2H), 0.91 (t, J = 7 Hz, 3H).

**Representative preparation of a 1-Alkyl-2-aryl-4-aminomethylimidazole:  
1-(1-Butyl)-2-phenyl-5-(N,N-di[3,4-methylenedioxyphenylmethyl])  
aminomethylimidazole)**



1-(1-Butyl)-2-phenyl-5-hydroxymethylimidazole (**103**). Aldehyde **102** is dissolved in methanol (150 mL). Sodium borohydride (3 g) is added in portions. After the addition was complete, the reaction is diluted with water and concentrated. The residue is dissolved in ethyl acetate, washed with brine, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The product is purified by flash chromatography on silica gel (5% MeOH/ $\text{CHCl}_3$ ) to give 4.17 g of **103** as a cream colored solid.  $^1\text{H-NMR}$  (400 MHz,

$\text{CDCl}_3$ ):  $\delta$  0.79 (3H, t,  $d=7.4$ ), 1.18 (2H, m,  $d=7.4$ ), 1.60 (2H, m,  $d=7.6$ ), 4.03 (2H, dd,  $d=7.6$ ), 4.56 (2H, s), 6.84 (1H, s), 7.39-7.50 (3H, m), 7.50-7.53 (2H, m).

1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl])aminomethylimidazole (104).

Hydroxymethylimidazole **103** (0.82 g) is dissolved in chloroform (10 ml) and treated with thionyl chloride (1 ml). The solution is heated to 50 °C for 30 min, cooled and evaporated. The residue is washed with benzene and evaporated to give the intermediate chloromethyl hydrochloride as a white powder which is taken up in acetonitrile (30 mL). This is added dropwise to a solution of piperonylamine (5 ml) in acetonitrile (10 mL). The reaction is allowed to stand overnight and then evaporated. The residue is taken up in ethyl acetate and washed with water. The organic layer is dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. Purification on silica gel (10% MeOH/ $\text{CHCl}_3$ ) provides the product as a pale yellow oil (0.91 g).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ):  $\delta$  0.79 (3H, t,  $d=7.4$ ), 1.18 (2H, m,  $d=7.4$ ), 1.56 (2H, m,  $d=7.4$ ), 3.75 (4H, s), 4.04 (2H, dd,  $d=8$ ), 5.92 (2H, s), 6.76 (2H, m), 6.84 (1H, s), 6.97 (1H, s), 7.38-7.44 (3H, m), 7.53-7.56 (2H, m).

1-(1-Butyl)-2-phenyl-5-(N-[3,4-methylenedioxyphenylmethyl]-N-(3,4-methylenedioxyphenylcarboxy)) aminomethylimidazole (**105**). Compound **104** (160 mg, 0.44 mmol) is dissolved in chloroform (5 ml, pentene stabilized) and treated sequentially with piperonyloyl chloride (100 mg) and triethylamine (1 ml). The mixture is stirred at room temperature overnight. The solution is concentrated and the residue taken up in ethyl acetate. The organic is washed with water, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. Purification by preparative thin layer chromatography (5% MeOH/ $\text{CHCl}_3$ ) provides compound **105** as a pale yellow oil (240 mg).  $^1\text{H}$ -NMR (400 MHz,  $\text{CDCl}_3$ ):  $\delta$  0.75 (3H, br), 1.16 (2H, br), 1.49 (2H, br), 4.01 (2H, br), 4.54 (2H, br), 4.68 (2H, br), 5.97 (2H, s), 5.99 (2H, s), 6.66 (2H, d,  $d=7.2$ ), 6.80 (2H, t,  $d=8$ ), 6.98-7.02 (2H, m), 7.40-7.47 (3H, m), 7.56 (2H, d,  $d=6.8$ ).

1-(1-Butyl)-2-phenyl-5-(N,N-di[3,4-methylenedioxyphenylmethyl])aminomethylimidazole (**106**). Amide **105** (215 mg) in tetrahydrofuran (THF, 3 ml) is added dropwise to a solution of alanine (1 M in THF, 2 ml) and the resulting solution

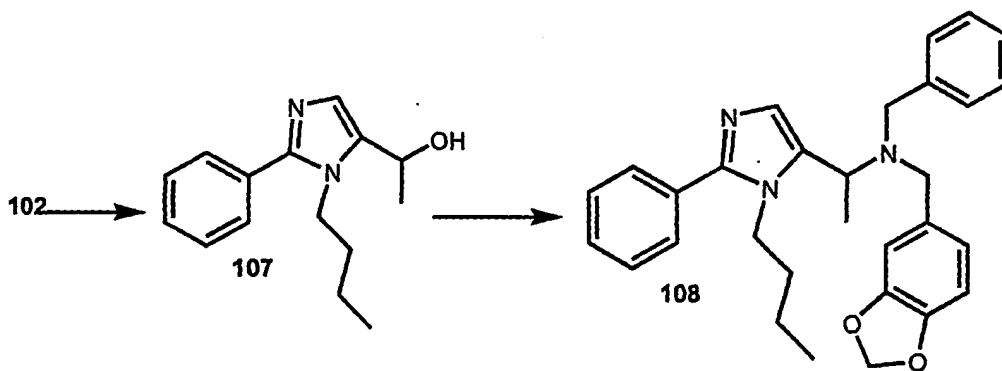


is stirred for 2.5 h at room temperature. A solution of sodium hydroxide (15% NaOH, 1 ml) is added and the mixture is extracted with chloroform. The organic extracts are dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. Purification by preparative thin layer chromatography (10% MeOH/ $\text{CHCl}_3$ ) provided compound **106** as a colorless oil (115 mg).  $^1\text{H}$ -NMR (400 MHz,  $\text{CDCl}_3$ ):  $\delta$  0.70 (3H, t,  $d=7.6$ ), 0.98 (2H, m,  $d=7.6$ ), 1.30 (2H, m), 3.44 (4H, s), 3.52 (2H, s), 3.98 (2H, dd,  $d=8$ ), 5.92 (4H, s), 6.74 (4H, s), 6.69 (2H, s), 7.02 (1H, s), 7.36-7.42 (3H, m), 7.54 (2H, dd,  $d=1.4$ , 6.6). The hydrochloride salt (m.p. 187-190 °C) was prepared in isopropanol.

Example 2. Preparation of 1-(1-butyl)-2-phenyl-5-(1-[N-(3,4-methylenedioxyphenyl)methyl]-N-phenylmethyl)amino]ethylimidazole (Compound 108).

1-Butyl-2-phenyl-5-(1-hydroxyethyl)imidazole (107). A solution of aldehyde **102** (230 mg) in diethyl ether (30 mL) is placed in a separatory funnel and treated with a solution of

**Preparation of  
1-(1-Butyl)-2-phenyl-5-(1-[N-[(3,4-methylenedioxyphenyl)methyl]-N-phenylmethyl]amino]ethylimidazole)**



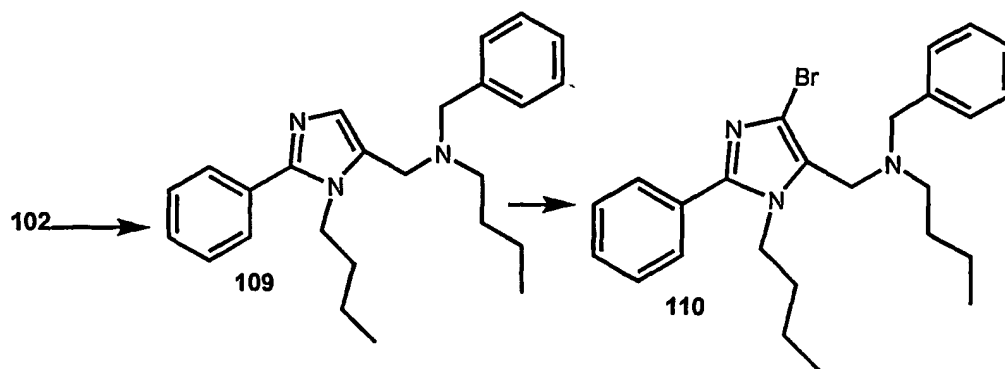
methyl lithium (1.4 M in THF, 1.5 ml). After 10 min, the solution is washed with ammonium chloride solution (1 M, 20 ml), dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting dark oil is purified by preparative TLC (10% MeOH/ $\text{CHCl}_3$ ) to provide compound **107** as a colorless oil (180 mg).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.56 (d,  $J = 2$

Hz, 2H), 7.4 (m, 3H), 7.01 (s, 1H), 4.86 (q, J = 7 Hz, 1H), 4.18 (m, 1H), 4.0 (m, 1H), 1.63 (d, J = 6.6 Hz, 3H), 1.63 (m, 2H), 1.23 (m, 2H), 0.81 (t, J = 7 Hz, 3H).

1-Butyl-2-phenyl-5-(N-[3,4-methylenedioxyphenyl]-N-phenylmethyl)aminoethylimidazole (**108**). A solution of compound 107 (80 mg) in chloroform (10 ml) is treated with thionyl chloride (1 ml) and heated to 50 °C for 30 min. The solution is then concentrated, diluted with chloroform and re-concentrated to provide the intermediate chloromethyl hydrochloride as an oil. This material is taken up in chloroform (5 ml) and treated sequentially with N-benzylpiperonylamine (80 mg) and triethylamine. After stirring overnight, the reaction is washed with saturated potassium carbonate solution, dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated. Purification by preparative thin layer chromatography (10% MeOH/CHCl<sub>3</sub>) provides compound **108** as a colorless oil (62 mg). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.46-7.43 (m, 1H), 7.2-7.3 (m, 9H), 6.74-6.86 (m, 4H), 5.94 (s, 2H), 4.82 (q, J = 6.8 Hz, 1H), 4.33 (m, 2H), 3.78 (s, 2H), 3.53 (s, 2H), 1.83 (d, J = 6.8 Hz, 3H), 1.62-1.68 (m, 2H), 1.21 (q, J = 7.8 Hz, 2H), 0.82 (t, J = 7.8 Hz, 3H).

Example 3. Preparation of 1-Butyl-2-phenyl-4-bromo-5-(N-phenylmethyl-N-[1-butyl]butyl)amino-methylimidazole (Compound 110).

**Preparation of 1-(1-Butyl)-2-phenyl-4-bromo-5-[N-phenylmethyl-N-[1-butyl]aminomethylimidazole)**



1-Butyl-2-phenyl-5-(N-benzyl-N-butyl)aminomethylimidazole (**109**). A solution of compound **102** (115 mg) and N-butylbenzylamine (85 mg) in toluene (10 ml) is allowed to stand overnight. Treatment of the reaction with sodium borohydride (100 mg) and ethanol (2 mL) followed by aqueous workup and purification on silica gel (10% MeOH/CHCl<sub>3</sub>) provides compound **109** as a colorless oil (35 mg). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.2-7.5 (m, 10H), 6.98 (s, 1H), 4.0 (t, J = 8 Hz, 2H), 3.55 (s, 2H), 3.52 (s, 2H), 2.42 (t, J = 8 Hz, 2H), 1.2-1.55 (m, 6 H), 1.05 (m, 2H), 0.84 (t, J = 7 Hz, 3H), 0.72 (t, J = 7 Hz, 3H).

1-Butyl-2-phenyl-4-bromo-5-(N-phenylmethyl-N-[1-butyl])aminomethylimidazole (**110**). To a solution of **109** (30 mg) in acetonitrile (4 mL) was added N-bromosuccinimide (16 mg). The resulting mixture was heated to 60 °C and the progress of the reaction followed by TLC. The cooled reaction mixture was diluted with ethyl acetate and washed twice with water. Purification by preparative thin layer chromatography (10% MeOH/CHCl<sub>3</sub>) provided compound **110** as a colorless oil (22 mg). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.2-7.5 (m, 10 H), 3.98 (t, J = 8 Hz, 2H), 3.55 (s, 2H), 3.53 (s, 2H), 2.46 (t, J = 7 Hz, 2H), 1.52 (m, 2H), 1.3 (m, 4H), 0.98 (q, J = 7 Hz, 2H), 0.84 (t, J = 7 Hz, 3H), 0.70 (t, J = 7 Hz, 3H).

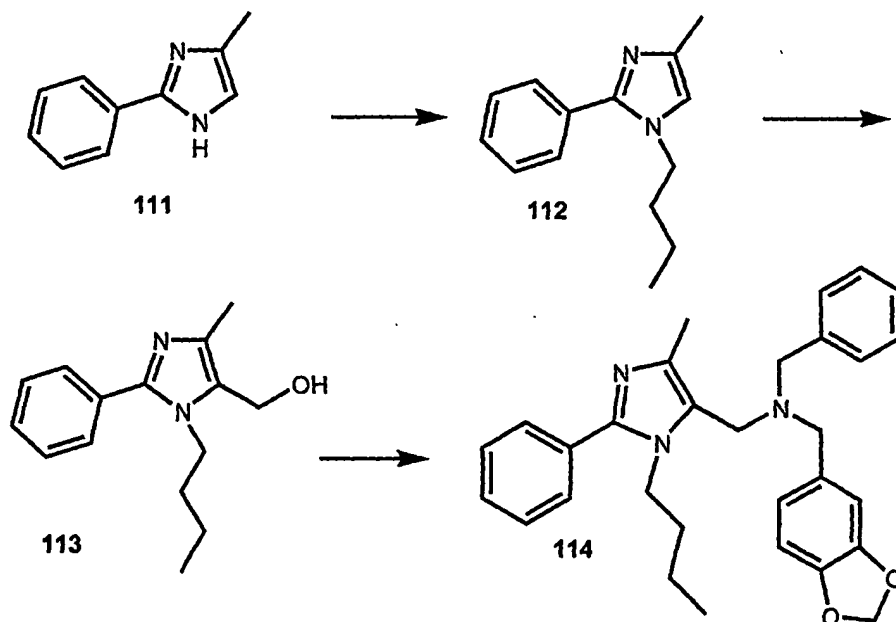
Example 4. Preparation of 1-(1-Butyl)-2-phenyl-4-methyl-5-(N-[3,4-methylenedioxyphenyl-methyl]-N-phenylmethyl)aminomethylimidazole. (Compound **114**).

1-Butyl-2-phenyl-4-methylimidazole (**112**). To a solution of 4-methyl-2-phenylimidazole (**111**, 15.8 g) in dimethylformamide (100 ml) is added sodium hydride (4.4 g, 60% in mineral oil) in small portions. After the addition is complete, the mixture was stirred for an additional 20 min and treated with 1-iodobutane (18.8 g). The reaction is fitted with a reflux condensor and heated at 100 °C for 12 h. The cooled reaction mixture is partitioned between water (300 ml) and diethyl ether (300 ml). The organic layer is washed with water (3X 200 ml), dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated to provide 20.5 g of N-butylimidazoles. Analysis by <sup>1</sup>H-NMR and GC-MS revealed mixture of 1-butyl-2-phenyl-4-methylimidazole (**112**) and 1-butyl-2-

phenyl-5-methylimidazole in a ratio of 11.5/1. The mixture was carried on to the next step without purification.

**1-Butyl-2-phenyl-4-methyl-5-hydroxymethylimidazole (113).** A solution of **112** (1 g) in acetic acid (10 mL) and 40% aqueous formaldehyde (2 mL) is refluxed for 14 h. The reaction is then concentrated and dried by repeated reconcentration with toluene. The residue is purified by column chromatography (10% MeOH/CHCl<sub>3</sub>). The fractions are assayed by GC and those fractions uncontaminated by the isomeric hydroxymethylimidazole combined. Concentration of the combined fractions provides compound **113** (320 mg) as a pale yellow oil. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.4-7.6 (m, 6H), 4.61 (s, 2H, CH<sub>2</sub>OH), 4.02 (t, J = 7 Hz, 2H, NCH<sub>2</sub>), 2.22 (s, 3H, Me), 1.63 (m, 2H, 1.25 (m, 2H), 0.81 (t, J = 7 Hz, 3H).

**Preparation of  
1-(1-Butyl)-2-phenyl-4-methyl-5-(N-[3,4-methylenedioxyphenyl]-N-phenylmethyl)  
aminomethylimidazole**



**1-Butyl-2-phenyl-4-methyl-5-(N-benzyl-N-butyl)aminomethylimidazole (114).** Compound 114 (23 mg) is prepared from **113** (50 mg) in a method similar to that used to obtain compound **108**. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.5-7.55 (m, 2H), 7.38-7.42 (m, 3H), 7.23-7.30 (m, 5H), 3.95 (t, J = 7.5 Hz, 2H), 3.55 (s, 2H), 3.53 (s, 2H),

2.40 (t, J = 7 Hz, 2H), 2.22 (s, 3H), 1.25-1.40 (m, 6H), 1.05 (m, 2H), 0.82 (t, J = 7 Hz, 3H). 0.70 (t, J = 7 Hz, 3H); MS (LCMS)  $m/e$  390 ( $M^+ + 1$ )

Example 5. Preparation of a cycloalkylimidazole compound: 4-[[butyl(1-butyl-2-phenyl(4,5,6-trihydrocyclopenta[3,2-d]imidazol-6-yl))amino]methyl]-3-chlorophenol

N-(n-butyl)-benzamidine (**120**). To a solution of methyl benzimidate hydrochloride (12 g, 0.07 mole) in dimethylformamide (DMF, 20 mL) is added 7 ml of triethylamine at 0 °C. After 2 h the reaction is filtered to remove triethylamine hydrochloride. To the filtrate is added 3.68 g of 1-butylamine and the mixture is heated to 60 °C for 6 h. After cooling the mixture is partitioned between ethyl acetate and water. The organic layer is washed with brine, dried over sodium sulfate and concentrated to provide 13.28 g of the amidine as a yellow oil.  $^1\text{H}$  NMR ( $\text{CDCl}_3$ ) 7.55 (m, 2H), 7.4 (m, 3H), 3.37 (bm, 2H), 1.62 (m, 2H), 1.42 (m, 2H), 0.95 (t, J = 7 Hz, 3H).

2-Bromo-3-methoxycyclopentenone (**131**) is prepared via the method of Curran et al JACS, vol 112, page 5601. To a suspension of 1,3-cyclopentanedione (10 g) in chloroform (700 ml) is added a N-bromosuccinimide (18.2 g). The mixture is refluxed for 2 h, cooled and concentrated. Methanol (700 mL) and p-toluenesulfonic acid (1 g) are added and the solution is refluxed overnight. The mixture is concentrated to 100 ml, diluted with methylene chloride (500 mL) and poured into water. The aqueous layer is discarded and the organic layer is washed with water (3 X 100 mL), dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The residue is crystallized from ethyl acetate to give **131** as tan crystals (1.67 g).

1-Butyl-2-phenyl-4,5-dihydrocyclopenty[1,2-d]imidazol-6-one (Compound **132**). To a mixture of amidine **130** (3.52 g, 20 mmol) and enone **13** (4.58 g, 24 mmol) in chloroform (40 mL) and water (5 mL) was added solid potassium carbonate (3.32 g, 24 mmol). The resulting mixture is refluxed overnight. After cooling, the mixture is washed with water, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. Purification on silica gel eluting with 25% ethyl acetate/hexane gives the desired product **132** (3.0 g) LC-MS

(M<sup>+</sup>+1): 255. <sup>1</sup>H-NMR (δ, CDCl<sub>3</sub>): 0.84 (t, J = 7.6 Hz, 3H), 1.23 (dt, J = 7.0, 7.6 Hz, 2H), 1.81 (m, 2H), 2.95 (m, 4H), 4.13 (t, J = 7.6 Hz, 2H) 7.5-7.45 (m, 3H), 7.76-7.6 (m, 2H) ppm.

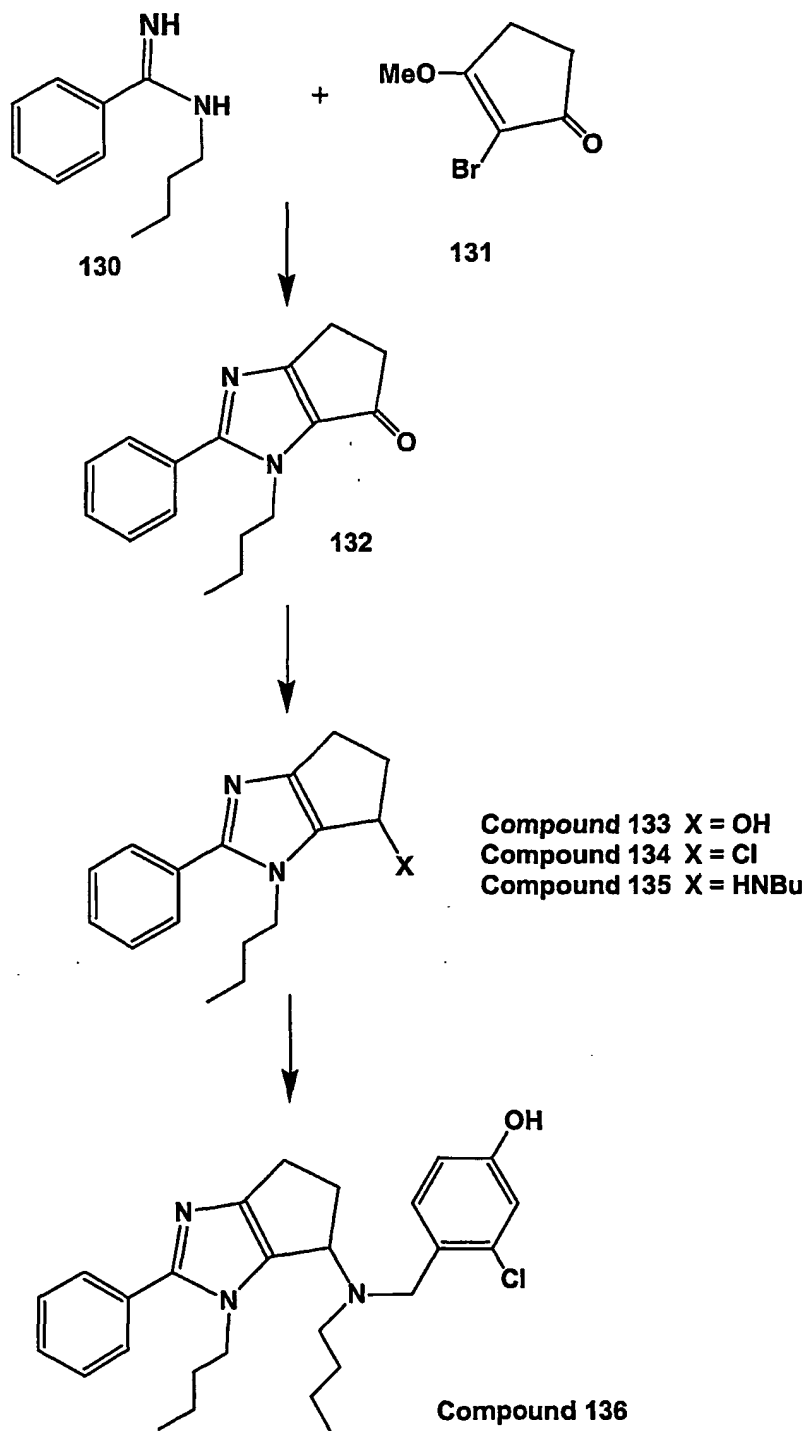
1-Butyl-2-phenyl-4,5-dihydrocyclopentyl[1,2-d]imidazol-6-ol (Compound 133). To a solution of **132** (2.68 g) in methanol (20 mL) is added sodium borohydride (1.5 equiv) and the mixture stirred overnight. The mixture is concentrated, diluted with chloroform and washed with 0.5 N NH<sub>4</sub>Cl solution. The organic layer is dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated to provide the desired product **133**. LC-MS (M + 1) 257.

Butyl(1-butyl-2-phenyl-4,5,6-trihydrocyclopentyl[3,2-d]imidazol-6-yl)amine (Compound 135). Compound **133** (2 g) is dissolved in chloroform (20 mL) and thionyl chloride (5 mL) and the resulting solution is stirred at room temperature overnight. The solvent and excess thionyl chloride are evaporated and the crude chloride **134** was dissolved in n-butylamine (10 mL). After 2 h, the excess butylamine was evaporated, the residue dissolved in ethyl acetate and the organic solution washed with 5% NaOH solution and water. The organic layer was dried and concentrated. The organic residue is purified by column chromatography on silica gel eluting with 10% CH<sub>3</sub>OH in CHCl<sub>3</sub> to provide the desired secondary amine **135** in 82% yield. LC-MS (M+1) 312 <sup>1</sup>H-NMR (chemical shift, CDCl<sub>3</sub>): 0.83 (t, J = 7.2 Hz, 3H), 0.9 (t, J = 7.2 Hz, 3H), 1.23 (q, J = 7.2 Hz, 2H), 1.35 (q, J = 7.2 Hz, 2H), 1.46 (m, 2H), 1.70 (m, 2H), 2.24 (m, 1H), 2.55-2.66 (m, 4H), 2.73-2.80 (m, 2H), 3.97-4.04 (m, 2H), 4.30 (d, J = 5.6 Hz, 1H), 7.37-7.44 (m, 3H), 7.55-7.57 (m, 2H).

4-[[Butyl(1-butyl-2-phenyl(4,5,6-trihydrocyclopenta[3,2-d]imidazol-6-yl))amino]methyl]-3-chlorophenol (Compound 5, Table 1). To a solution of compound **135** (50 mg) in 1,2-dichloroethane (2 mL) and 2-chloro-4-hydroxybenzaldehyde (30 mg) is added sodium triacetoxyborohydride (100 mg). The resulting mixture is allowed to stir overnight. After washing with 0.5 ammonium chloride solution, the organic layer is dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated. Purification

using preparative thin layer chromatography eluting with 5% CH<sub>3</sub>OH/CHCl<sub>3</sub> provides the desired product **136** as an oil (21 mg). LC-MS (M+1) 452, (M-1) 450. <sup>1</sup>H-NMR (chemical shift, CDCl<sub>3</sub>): 0.74 (t, J = 7.2 Hz, 3H), 0.83 (t, J = 7.2 Hz, 3H), 1.11 (q, J = 7.2 Hz, 2H), 1.21-1.33 (m, 2H), 1.41-1.51 (m, 4H), 2.34-2.44 (m, 3H), 2.51-2.57 (m, 1H), 2.60-2.67 (m, 1H), 2.69-2.75 (m, 1H), 3.38 (d, J = 7.6 Hz, 1H), 3.47 (d, J = 13.6 Hz, 1H), 3.65 (d, J = 13.6 Hz, 1H), 3.78-3.96 (m, 1H), 6.62 (dd, J = 8.2 Hz, 1H), 6.78 (d, J = 2 Hz, 1H), 7.07 (d, J = 8 Hz, 1H), 7.35-7.41 (m, 3H), 7.45-7.48 (m, 2H).

**Preparation of 4-([Butyl(1-butyl-2-phenyl(4,5,6-trihydrocyclopenta[3,2-d]imidazol-6-yl))amino]methyl)-3-chlorophenol**





Example 6. Preparation of 2-phenyl-4-(N,N-di(2H-Benzo[3,4-d]-1,3-dioxolan-5-ylmethyl)amino)methyl-3-butylpyridine

**4-Phenyl-5-butyloxazole (140).** A mixture of  $\alpha$ -bromohexanophenone (25.5 g, 0.1 mole), ammonium formate (22 g, 0.35 mole) and formic acid (110 mL) was refluxed with stirring for 3 h. The reaction mixture was poured onto ice and made basic with 10 N NaOH and extracted with ether. The organic layer was washed with water, dried over sodium sulfate and concentrated. The crude product was purified by flash chromatography on silica gel eluting with 20% ethyl acetate in hexane. To provide the desired compound as an oil (8.3 g, 41 %);  $^1\text{H}$  NMR ( $\delta$ ,  $\text{CDCl}_3$ , 400 MHz) 7.55 (m, 2H), 7.40 (s, 1H), 7.34 (dd,  $J = 7, 7$  Hz, 2H), 7.22 (dd,  $J = 7, 7$  Hz, 1H), 2.74 (m, 2H), 1.6 (m, 2H), 1.30 (m, 2H), 0.84 (t,  $J = 7$  Hz, 3H) ppm.

**2-Phenyl-3-butylysonicotinic acid (141).** A mixture of 4-phenyl-5-butyloxazole (12, 5 g, 25 mmol) and maleic acid (3.5 g, 30 mmol) is heated at 100 °C for 30 min. After cooling, the semisolid mass is triturated with ether and the solid collected by filtration.  $^1\text{H}$  NMR ( $\delta$ ,  $\text{CDCl}_3$ , 400 MHz) 11.68 (brs, 1H), 8.72 (d,  $J = 6.0$  Hz, 1H), 7.73 (d,  $J = 5.6$  Hz, 1H), 7.48-7.51 (m, 2H), 7.42-7.44 (m, 2H), 6.25 (s, 1H), 2.86 (d,  $J = 7.6$  Hz, 2H), 1.36 (m, 2H), 1.11 (dt,  $J = 7.6, 7.2$  Hz, 2H), 0.68 (t,  $J = 7.6$  Hz, 3H). MS ( $M+1$ ): 256, ( $M - 1$ ) 254.

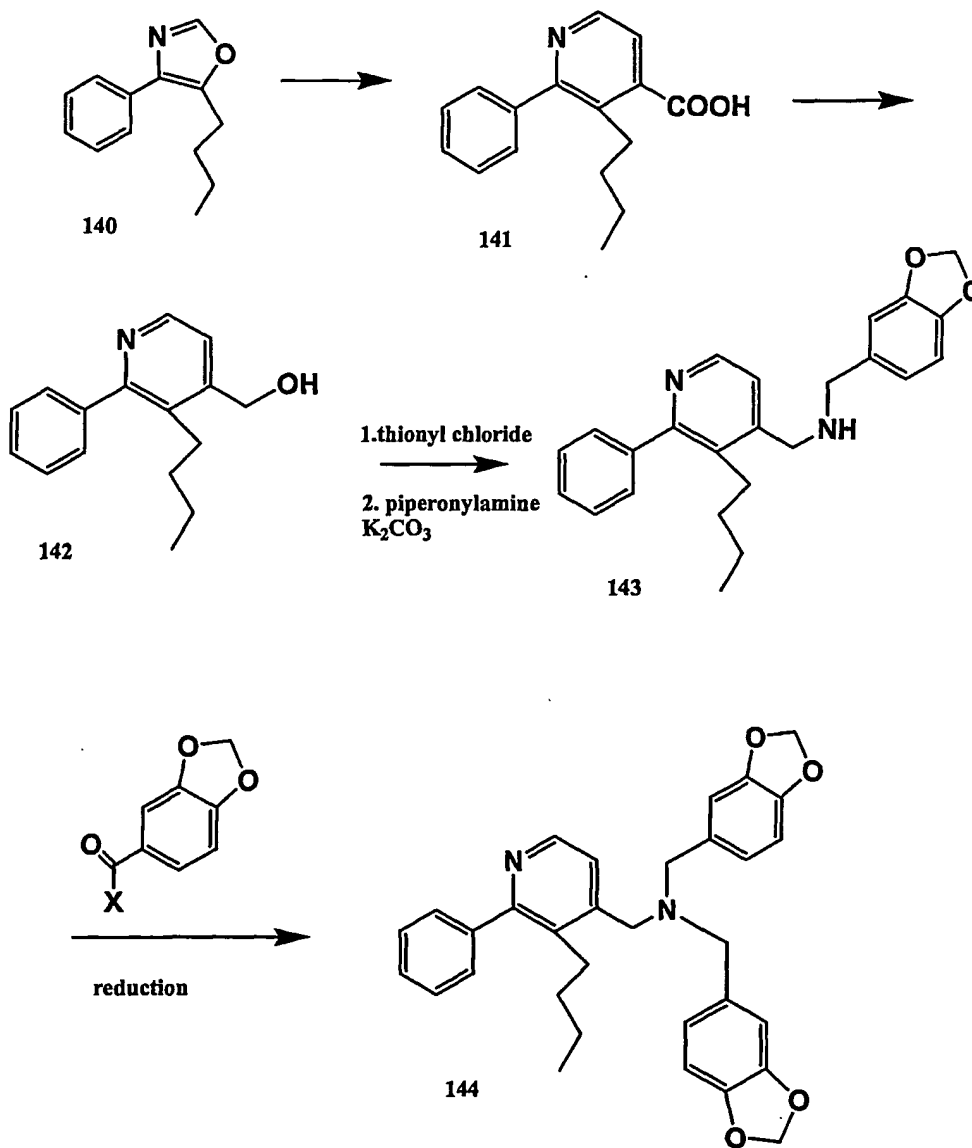
**2-Phenyl-4-hydroxymethyl-3-butylpyridine (142).** 4 mL of a 1M solution of lithium aluminum hydride in tetrahydrofuran is added to a solution of 2-phenyl-3-butylysonicotinic acid (13, 510 mg, 2 mmol) in tetrahydrofuran (20 mL). The reaction is stirred overnight and then quenched with 5 mL of 15% aqueous NaOH. The resulting mixture is extracted with ether, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated to provide the desired hydroxymethylpyridine as an oil (470 mg). LC-MS ( $M+1$ ): 242;  $^1\text{H}$  NMR ( $\delta$ ,  $\text{CDCl}_3$ ) 8.35 (1H, d,  $J = 5.2$  Hz), 7.30-7.39 (6H, m), 4.59 (2H, s), 2.43 (2H, t,  $J = 8.0$  Hz), 1.23 (2H, m), 1.13 (2H, m), 0.70 (3H, t,  $J = 7.2$  Hz).

**2-Phenyl-4-(N(2H-benzo[3,4-d]-1,3-dioxolan-5-ylmethyl)aminomethyl-3-butylpyridine (143).** Thionyl chloride (200 mg, 1.67 mmol) is added to a solution of 2-phenyl-4-hydroxymethyl-3-butylpyridine (400 mg, 1.66 mmol) in pentene stabilized chloroform (8 mL) and the mixture is heated to 50 °C for 2 h. The resulting

mixture is cooled, washed with saturated sodium bicarbonate solution, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting crude chloride is taken up in dimethylformamide (10 mL) and added dropwise to a refluxing solution of piperonylamine (1.0 g, 4 equiv) in dimethylformamide (30 mL) containing 3 g of powdered potassium carbonate. After the addition is complete, the resulting mixture is refluxed for an additional 3 h, cooled and partitioned between water (200 mL) and ether (100 mL). The ethereal layer is washed 2 times with water, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting material is purified by chromatography on silica eluting with 10%  $\text{CH}_3\text{OH}/\text{CHCl}_3$  to give the desired secondary amine 15. LC-MS ( $M+1$ ): 375.3;  $^1\text{H-NMR}$  ( $\delta$ ,  $\text{CDCl}_3$ ): 0.73 (3H, t,  $J = 7.2$  Hz), 1.15 (2H, m,  $J = 7.2$  Hz), 1.30 (2H, m), 2.58 (2H, t,  $J = 8.0$  Hz), 3.79 (2H, s), 3.83 (2H, s), 5.93 (2H, s), 6.75-6.82 (2H, m), 6.89 (1H, d,  $J = 1.2$  Hz), 7.36-7.42 (6H, m), 8.45 (1H, d,  $J = 4.8$  Hz) ppm.

**2-Phenyl-4-(*N,N*-di(2H-benzo[3,4-*d*]-1,3-dioxolan-5-ylmethyl)aminomethyl-3-butylpyridine (144).** To a solution of 14 (38 mg) in dichloroethane (5 mL) was added piperonal (30 mg). The resulting mixture was stirred for 3 h after which time sodium triacetoxyborohydride (150 mg) is added in one portion and the resulting mixture is stirred overnight. The reaction mixture was quenched with 10% ammonium hydroxide solution (5 mL). The organic layer is washed with water and extracted with 1N HCl solution. The acidic extract is made basic with 1N NaOH solution and extracted with chloroform. The organic extract is dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting oil is purified on preparative thin layer chromatography eluting with 10%  $\text{CH}_3\text{OH}/\text{CHCl}_3$  to give the desired tertiary amine **144** as an oil (18 mg). LC-MS ( $M+1$ ): 509.4;  $^1\text{H-NMR}$  ( $\delta$ ,  $\text{CDCl}_3$ ): 0.71 (3H, t,  $J = 7.2$  Hz), 1.10 (2H, m,  $J = 7.2$  Hz), 2.60 (2H, t,  $J = 8.0$  Hz), 3.48 (4H, s), 3.58 (2H, s), 5.94 (4H, s), 6.75 (1H, d,  $J = 8.0$  Hz), 6.80 (1H, dd,  $J = 0.8, 8.0$  Hz), 6.91 (1H, d,  $J = 0.8$  Hz), 7.36-7.43 (5H, m), 7.56 (1H, d,  $J = 5.2$  Hz), 8.47 (1H, d,  $J = 5.2$  Hz) ppm.

**Preparation of 2-Phenyl-4-(N,N-di{2H-benzo[3,4-d]-1,3-dioxolan-5-ylmethyl})  
aminomethyl-3-butylpyridine**



**Example 7. Preparation of an Arylpyrazole:**

1,3-diphenyl-4-[N-(2H-benzo[3,4-d]-1,3-dioxolan-5-ylmethyl)-N-butylamino)methyl-5-propylpyrazole

**N'-Phenyl-N-phenylhydrazone (150).** Benzaldehyde (9.81 g, 9.25 mmol) is added at 0-5 °C to a solution of phenyl hydrazine (10 g, 9.25 mmol) in ethanol (100 mL). A cream colored solid forms and the reaction mixture is allowed to stand for 2h. The solid is collected by filtration, washed with ice-cold ethanol and dried under vacuum to provide the desired compound, compound 150 (14.92 g); LC-MS m/z 197.2, <sup>1</sup>H NMR (6, CDCl<sub>3</sub>, 400 MHz) ppm.

**Ethyl 1,3-diphenyl-5-propylpyrazole-4-carboxylate (152).** A mixture of 150 (5 g, 25.5 mmol) and ethyl butyrylacetate (20.2 g, 128 mmol) and a catalytic amount of zinc chloride is heated at 125 °C under an air atmosphere for 3h. The reaction vessel is fitted with a short path distillation head and excess ethyl butyrylacetate is distilled away under vacuum. The resulting material is purified by column chromatography on silica eluting with 10% ethyl acetate in hexanes to provide the desired ester 152 as a yellow oil (6.39 g) which crystallizes upon standing. Recrystallization from diisopropyl ether provides a white solid. <sup>1</sup>H NMR (6, CDCl<sub>3</sub>, 400 MHz) MS (M+1): 335.2

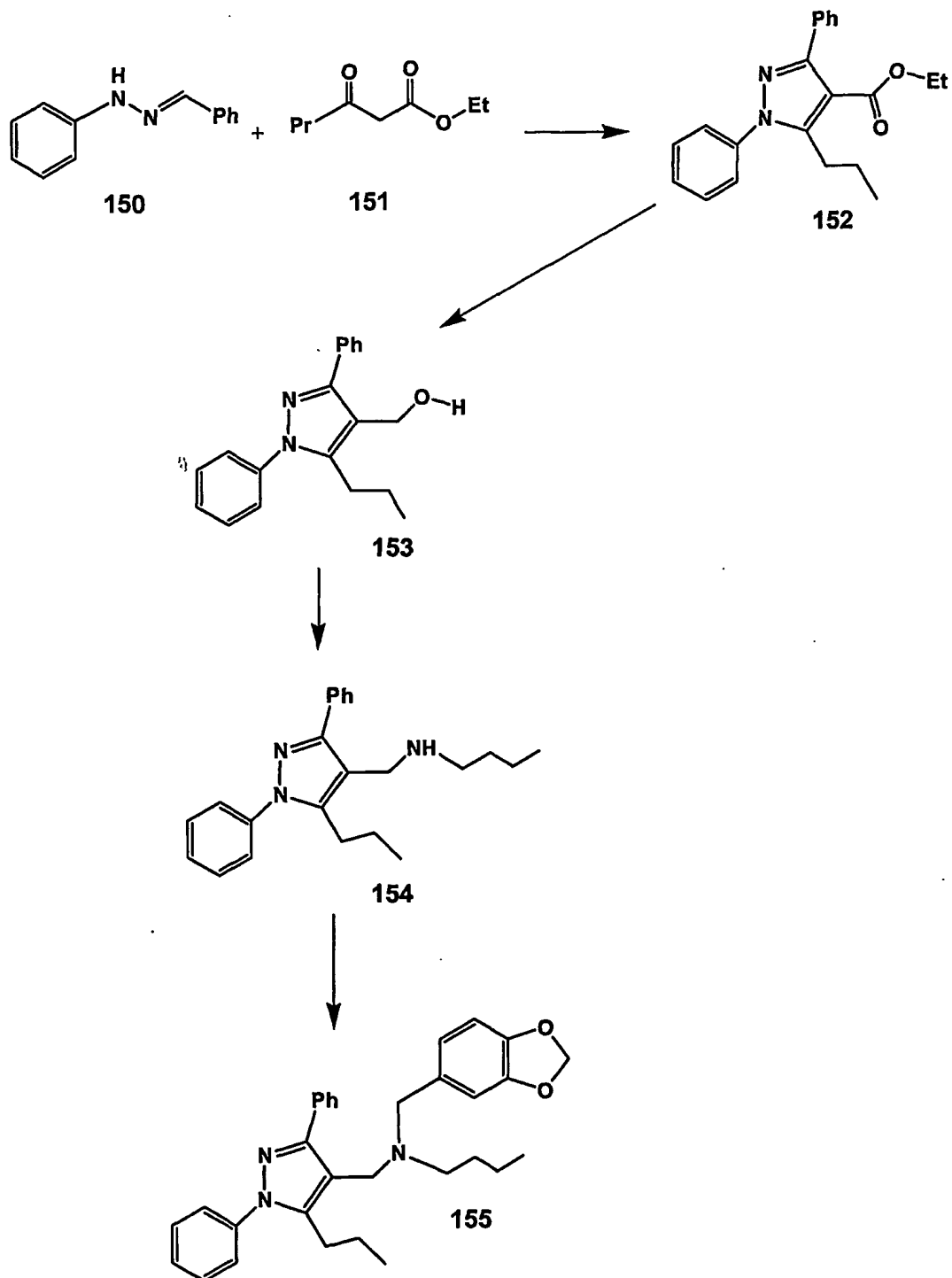
**1,3-Diphenyl-4-hydroxymethyl-5-propylpyrazole (153).** To a solution of ester 153 (670 mg, 2 mmol) in tetrahydrofuran (20 mL) is added 4 mL of a 1M solution of lithium aluminum hydride in tetrahydrofuran. The reaction is stirred overnight and then quenched with 5 mL of 15% aqueous NaOH. The resulting mixture is extracted with ether, dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated to provide the desired hydroxymethylpyrazole as an oil (505 mg). LC-MS (M+1): 293.3; <sup>1</sup>H NMR (6, CDCl<sub>3</sub>) 7.86 (dd, J = 8.4 Hz, 2H), 7.34-7.52 (m, 8H), 4.65 (s, 2H), 2.72 (t, J = 8.0 Hz, 2H), 1.52 (m, 2H), 0.87 (t, J = 7.6 Hz, 3H).

**[(1,3-Diphenyl-5-propylpyrazol-4-yl)methyl]butylamine (154).** To a solution of 18 (289 mg) in pentene stabilized chloroform (8 mL) is added thionyl chloride (1 mL) and the mixture heated to 60 °C for 2 h. The resulting mixture is cooled, washed with saturated sodium bicarbonate solution, dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated. The resulting crude chloride is taken up in dimethylformamide (3 mL)

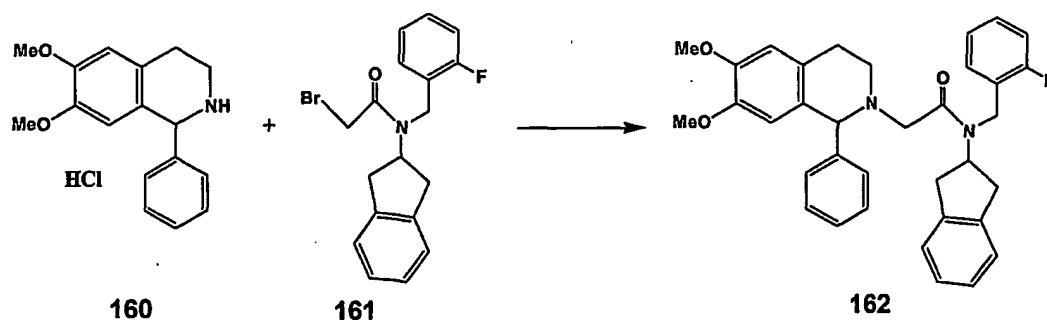
and added dropwise to a solution of butylamine (1.0 g) in dimethylformamide (10 mL) containing 2 g of powdered potassium carbonate. After the addition is complete, the resulting mixture is stirred for an additional 3 h and partitioned between water (20 mL) and ether (10 mL). The ethereal layer is washed 2 times with water, dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting material is purified by chromatography on silica eluting with 10%  $\text{CH}_3\text{OH}/\text{CHCl}_3$  to give the desired secondary amine **155** (190 mg). LC-MS ( $M+1$ ): 348.3;  $^1\text{H-NMR}$  ( $\delta$ ,  $\text{CDCl}_3$ ): 7.87 (dd,  $J = 8.0, 1.6$  Hz, 2H), 7.32-7.48 (m, 8H), 3.77 (s, 2H), 2.70 (m, 4H), 1.48 (m, 4H), 1.34 (m, 2H), 0.91 (t,  $J = 7.6$  Hz, 3H), 0.87 (t,  $J = 7.6$  Hz, 3H) ppm.

**1,3-Diphenyl-4-(N-(2H-benzo[3,4-d]-1,3-dioxolan-5-ylmethyl)-N-butylamino)methyl-5-propylpyrazole (Compound 155).** To a solution of **154** (35 mg) in dichloroethane (5 mL) is added piperonal (30 mg). The resulting mixture is stirred for 3 h after which time sodium triacetoxyborohydride (150 mg) is added in one portion and the resulting mixture is stirred overnight. The reaction mixture is quenched with 10% ammonium hydroxide solution (5 mL). The organic layer is washed with water and extracted with 1N HCl solution. The acidic extract is made basic with 1N NaOH solution and extracted with chloroform. The organic extract is dried ( $\text{Na}_2\text{SO}_4$ ) and concentrated. The resulting oil is purified on preparative thin layer chromatography eluting with 10%  $\text{CH}_3\text{OH}/\text{CHCl}_3$  to give the desired tertiary amine (**Compound 155**) as an oil (24 mg). LC-MS ( $M+1$ ): 482.5;  $^1\text{H-NMR}$  ( $\delta$ ,  $\text{CDCl}_3$ ): 7.87 (d,  $J = 7.2$  Hz, 2H), 7.47 (d,  $J = 4.4$  Hz, 4H), 7.33-7.43 (m, 4H), 6.77 (s, 1H), 6.70 (s, 2H), 5.92 (s, 2H), 3.56 (s, 2H), 3.42 (s, 2H), 2.74 (t,  $J = 8.0$  Hz, 2H), 2.37 (t,  $J = 7.2$  Hz, 2H), 1.42 (m, 4H), 1.21 (m, 2H), 0.83 (t,  $J = 7.6$  Hz, 3H), 0.81 (t,  $J = 7.2$  Hz, 3H) ppm.

Preparation of 1,3-Diphenyl-4-(N-[2H-benzo[3,4-d]-1,3-dioxolan-5-ylmethyl]-N-butylamino)methyl-5-propylpyrazole

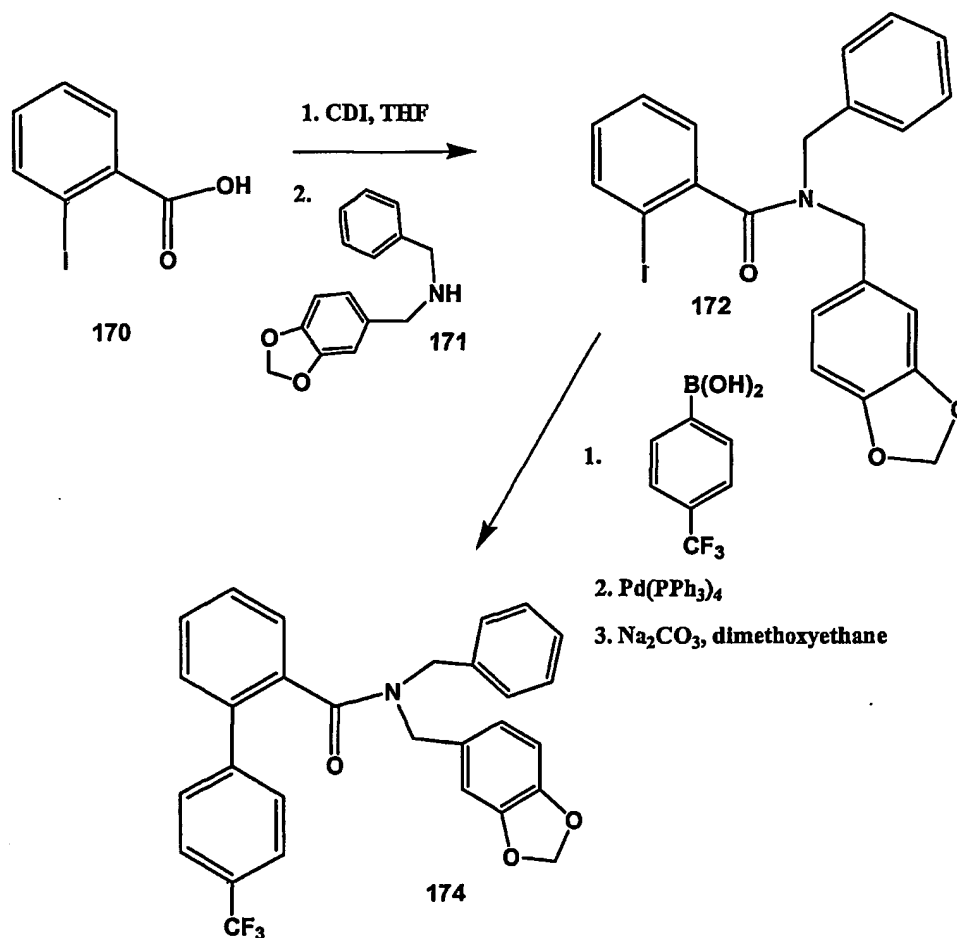


**Example 8. Synthesis of *N*-(1-fluorobenzyl)-*N*-indan-2-yl-2-(6, 7-dimethoxy-1-phenyl-1,2,3,4-tetrahydroisoquinolin-1-yl) acetamide (162).** A mixture of 6, 7-dimethoxy-1-phenyl-1,2,3,4-tetrahydroisoquinoline hydrochloride (**160**, 153 mg, 0.5 mmol), *N*-(1-fluorobenzyl)-*N*-indan-2-yl-2-bromoacetamide (**161**, 180 mg, 0.5 mmol) and potassium carbonate (500 mg) in acetonitrile is heated at 80 °C overnight. After cooling, the mixture is filtered and concentrated. The resulting residue is purified by column chromatography eluting with 5% methanol in chloroform to provide the title product (**162**) as a thick oil (215 mg, 78%). <sup>1</sup>H NMR (CDCl<sub>3</sub>) 6.8-7.3 (m, 14H), 6.60(s, 1H), 6.05 (s, 1H),



**Example 9. Preparation of 4-Trifluoromethyl-biphenyl-2-carboxylic acid benzo[1,3]dioxol-5-ylmethyl-benzyl-amide (174).** 1,1'-carbonyldiimidazole (175 mg) is added to a solution of 2-iodobenzoic acid (248 mg, 1 mmol)(**170**) in tetrahydrofuran (THF, 5 ml). The resulting mixture is stirred overnight at room temperature. A solution of *N*-3,4-methylenedioxybenzyl-*N*-benzylamine (241 mg, 1 equiv)(**171**) in THF (2 mL) is added and the resulting solution is stirred for 1 h, quenched with water and extracted with diethyl ether. The organic extracts are dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated. The residual material is taken up in dimethoxyethane (10 mL) and a catalytic amount (20 mg) of tetrakis(triphenylphosphine)palladium(0) is added. The resulting mixture is stirred under an argon atmosphere for 10 min and solid 4-trifluoromethylphenylboronic acid (150 mg) is added in one portion. A second phase of 1N aqueous Na<sub>2</sub>SO<sub>4</sub> is added and the mixture is warmed to 80 °C for 6 h under a argon atmosphere. The solution is cooled, diluted with water and ethyl acetate and filtered through a pad of

celite. The organic phase is dried over sodium sulfate and concentrated. Purification on silica eluting with 20% ethyl acetate in hexane provided the desired biphenylamide product (**174**)(410 mg). The proton NMR displays a doubled pattern commonly observed for amides which possess some rotational restriction about the amide nitrogen at room temperature. The ratio of the rotomers is approximately equal.  $^1\text{H}$  NMR ( $\text{CDCl}_3$ ) 3.50 and 3.62 (two doublets,  $J = X$  Hz, 1H), 3.72 and 3.83 (two doublets,  $J = X$  Hz, 1H), 4.10 and 4.18 (two doublets,  $J = X$  Hz, 1H), 5.09 and 5.16 (two doublets,  $J = x$  Hz, 1H), 5.95 (d,  $J = X$  Hz, 2H,  $\text{OCH}_2\text{O}$ ), 6.30 (m, 1.5 H), 6.46 (d,  $J = 1$  Hz, 0.5 Hz), 6.60 and 6.66 (two doublets,  $J = X$  Hz, 1H), 6.80 (bd,  $J = X$  Hz, 1H), 6.86 (m, 1H), 7.16-7.62 (m, 11 H).



4'-Trifluoromethyl-biphenyl-2-carboxylic acid benzo[1,3]dioxol-5-ylmethyl-benzyl-amide

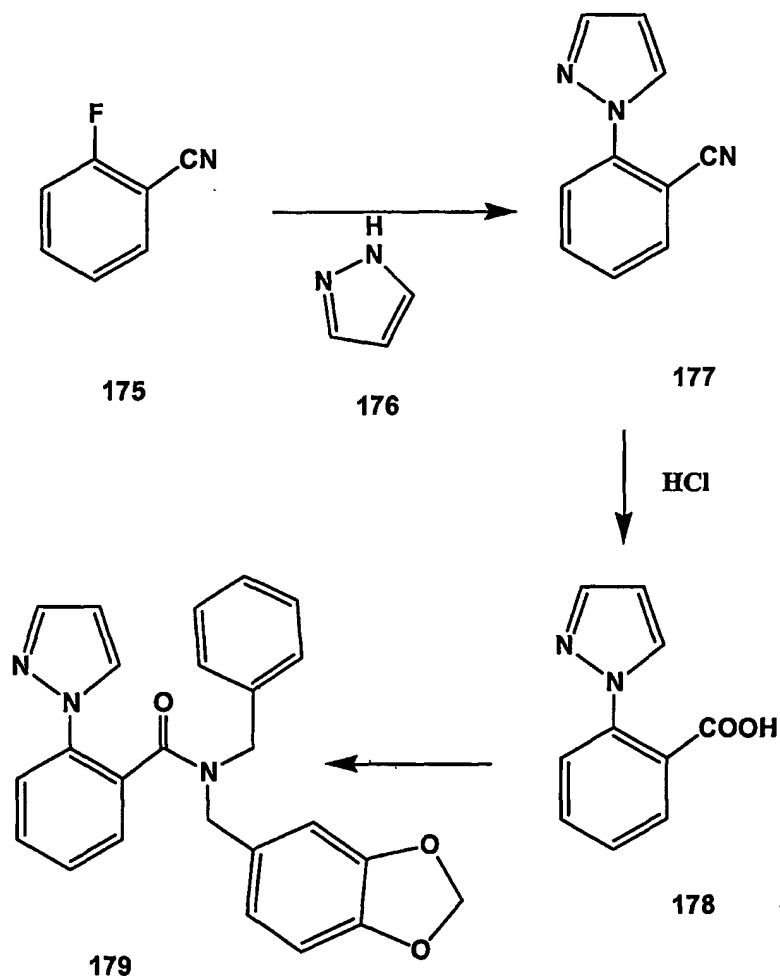


Example 10. Preparation of N-Benzo[1,3]dioxol-5-ylmethyl-N-benzyl-2-pyrazol-1-yl-benzamide

**2-Pyrazol-1-yl-benzonitrile, Compound 177.** A solution of 20 mmol of 2-fluorobenzonitrile and 40 mmol of pyrazole is mixed together in dimethylformamide with 1 equivalent of potassium hydroxide and a catalytic amount of 18-crown-6. The mixture is stirred at room temperature overnight, quenched with water and ethyl acetate and extracted with ethyl acetate. The organic extract is washed repeatedly with 1 N NaOH solution. The organic layer is then diluted with ether and washed with 1N HCl solution, dried and concentrated. <sup>1</sup>H NMR (CDCl<sub>3</sub>) 6.55 (t, J = 2 Hz, 1H), 7.42 (M, 1H), 7.65-7.82 m, 4H), 8.15 (d, J = 1 Hz, 1H).

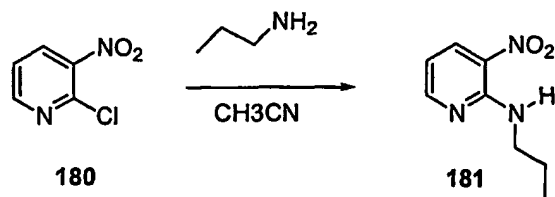
**2-Pyrazol-1-yl-benzoic acid, Compound 178.** A solution of compound 177 in conc HCl is refluxed overnight, cooled and concentrated. The product is precipitated by addition of 1 N NaOH until pH of 5-6, filtered and dried. <sup>1</sup>H (CDCl<sub>3</sub>) 6.52 (t, J = 3 Hz, 1H), 7.40 (d, J = 8 Hz, 1H), 7.50 (t, J = 8 Hz, 1H) 7.62 (t, J = 8 Hz, 1H), 7.81 (m, 2H), 8.12 (d, J = 8 Hz, 1H).

**N-Benzo[1,3]dioxol-5-ylmethyl-N-benzyl-2-pyrazol-1-yl-benzamide, Compound 179.** 1.1 equiv of carbonyl diimidazole is added to a solution of benzoic acid 178 (200 mg) in tetrahydrofuran (5 mL); the reaction is stirred at room temperature for 3 h. After this time *N*-piperonyl-*N*-benzylamine (0.25 g) is added in one portion. After 30 min, the reaction is filtered, diluted with ether and washed with water. The organic layer is dried (Na<sub>2</sub>SO<sub>4</sub>) and purified over column chromatography to provide the desired product (390 mg). The proton NMR displays a typically doubled pattern. <sup>1</sup>H (CDCl<sub>3</sub>) 3.83 and 4.32 (two doublets, J = 16 Hz, 1H), 3.91 (two doublets, J = 8 Hz, 1H), 4.18 two doublets (J = 6 Hz, 1H), 5.0 and 5.1 (two doublets, J = 14 Hz, 1H), 5.93 and 5.98 (s and doublet, J = 2 Hz, 2H, OCH<sub>2</sub>O), 6.35-6.40 (m, 2H), 6.51 (d, J = 4 Hz, 0.5 H), 6.4 (m, 1.5 H), 7.0-7.88 m, 15H). LC-MS 412.3



**Example 11. Preparation of N-benzoyl-N-(4-methoxybenzyl)-N-(1-propyl-2-methylene-7-azabenzimidazole**

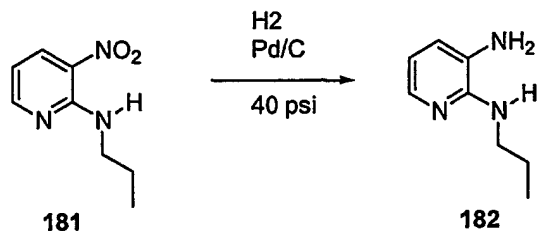
**2-aminopropyl-3-nitropyridine**



2-chloro-3-nitroaminopyridine (**180**) (5.5 g, 35 mmol) is dissolved in 150 mL acetonitrile at room temperature. Propylamine (21 g, 350 mmol) is added dropwise and the reaction mixture is stirred for 5 hours at room temperature. The solvent and excess propylamine are removed *in vacuo*. The residue is dissolved in 150 mL ethyl acetate and washed once with 100 mL saturated NaHCO<sub>3</sub> solution and once

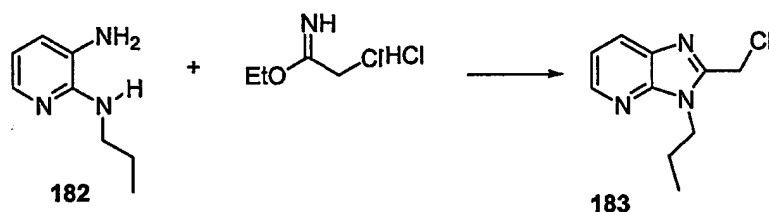
with 100 mL brine. The organic layer is dried over  $\text{MgSO}_4$ , filtered, and the solvent removed *in vacuo* to afford 6.3 g of 2-aminopropyl-3-nitropyridine (**181**).

**2-aminopropyl-3-aminopyridine.**



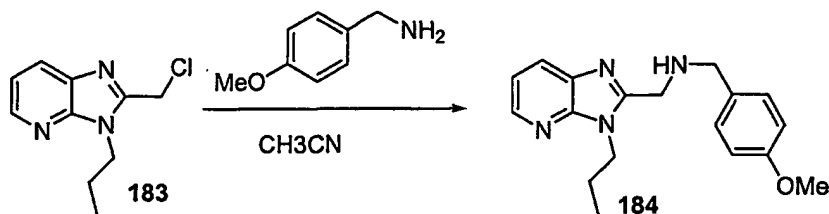
2-aminopropyl-3-nitropyridine (**181**) (6.3 g, 35 mmol) is dissolved in 100 mL 1/1 ethyl acetate / ethanol in a Parr shaker bottle. Nitrogen is bubbled through the solution for 2 minutes followed by the addition of 10% Pd/C (500 mg). The suspension is hydrogenated on a Parr apparatus under 40 psi of  $\text{H}_2$  until hydrogen uptake ceased. The suspension is filtered through Celite and the solvent evaporated *in vacuo* to afford 5.3 g of the 2-aminopropyl-3-aminopyridine (**182**).

**1-propyl-2-chloromethyl-7-azabenzimidazole**



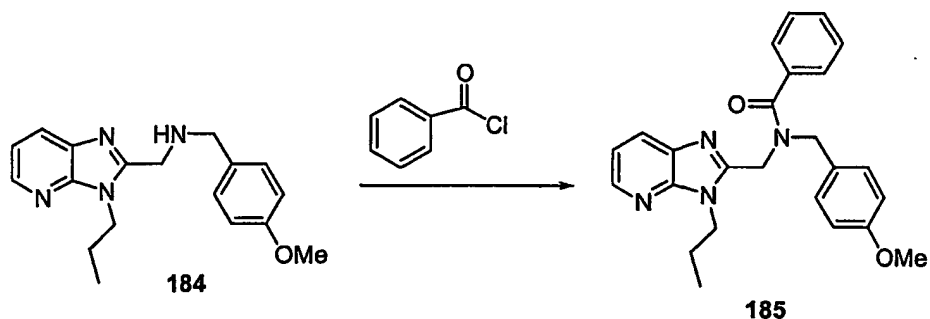
2-aminopropyl-3-aminopyridine (**182**) (5.3 g, 35 mmol) is dissolved in 100 mL  $\text{CHCl}_3$  at room temperature. Ethyl chloromethylimidate hydrochloride (14 g, 89 mmol) is added followed by  $\text{K}_2\text{CO}_3$  (25 g, 180 mmol). The suspension was stirred vigorously at room temperature for 3 hours. The reaction mixture is filtered through Celite and the solvent removed *in vacuo*. The residue is passed through a short plug of silica gel eluting with ethyl acetate to afford 3.7 g of 1-propyl-2-chloromethyl-7-azabenzimidazole (**183**).

**1-propyl-2-(4-methoxybenzylamino)methyl-7-azabenzimidazole.**



4-Methoxybenzylamine (3.8 g, 27 mmol) is dissolved in 20 mL dry acetonitrile. 1-propyl-2-chloromethyl-7-azabenzimidazole (**173**) (940 mg, 4.5 mmol) dissolved in 4.5 mL acetonitrile is added dropwise. The mixture is stirred 10 hours at room temperature. The solvent is removed *in vacuo* and the residue dissolved in 20 mL ethyl acetate. This solution is washed once with 20 mL 1 N NaOH, once with 20 mL water, once with 20 mL 5% HOAc in water, then once with 5 N NaOH. The organic phase was dried over MgSO<sub>4</sub>, filtered, then concentrated *in vacuo*. The product mixture is purified by flash chromatography eluting with ethyl acetate followed by 95/5/1 ethyl acetate / methanol / triethylamine to afford 850 mg of the 1-propyl-2-(4-methoxybenzylamino)methyl-7-azabenzimidazole (**184**).

**N-benzoyl-N-(4-methoxybenzyl)-N-(1-propyl-2-methyleno-7-azabenzimidazole**



1-propyl-2-(4-methoxybenzylamino)methyl-7-azabenzimidazole (**174**) (19 mg, 0.06 mmol) is dissolved in 0.6 mL toluene. Saturated sodium bicarbonate solution in water (0.3 mL) is added followed by benzoyl chloride (11 mg, 0.08 mmol). The reaction mixture is stirred at room temperature for 10 hours. It is then diluted with 5 mL ethyl acetate and transferred to a separatory funnel. The aqueous layer is removed and the organic phase washed once with 1N NaOH, once with 5 mL water, then and once with mL brine. The organic phase is dried over MgSO<sub>4</sub>, filtered and the solvent removed *in vacuo*. The product is purified by preparatory tlc eluting with

1/1 ethyl acetate / hexanes to afford 20 mg of the desired compound (**185**). NMR 400 MHz (CDCl<sub>3</sub>) 8.39 ppm (br d, 1 H), 8.15 ppm (br d, 1 H), 7.52 ppm (m, 1.5 H), 7.40 ppm (s, 1.5 H), 7.22 (m, 1 H), 7.18 ppm (br d, 1 H), 6.83 ppm, (d, J = 4 Hz, 2 H), 4.93 ppm (br s, 2 H), 4.71 ppm (br s, 1 H), 4.39 ppm (br s, 1 H), 3.79 ppm (s, 3 H), 1.89 ppm (br m, 2 H), 0.98 ppm (br t, 3 H).

### **Example 12**

#### **Assay for C5a Receptor Mediated Chemotaxis**

This assay is a standard assay of C5a receptor mediated chemotaxis.

Human promonocytic U937 cells or purified human or non-human neutrophils are treated with dibutyryl cAMP for 48 hours prior to performing the assay. Human neutrophils or those from another mammalian species are used directly after isolation. The cells are pelleted and resuspended in culture media containing 0.1% fetal bovine serum (FBS) and 10 ug/ml calcein AM (a fluorescent dye). This suspension is then incubated at 37 °C for 30 minutes such that the cells take up the fluorescent dye. The suspension is then centrifuged briefly to pellet the cells, which are then resuspended in culture media containing 0.1% FBS at a concentration of approximately  $3 \times 10^6$  cells/mL. Aliquots of this cell suspension are transferred to clean test tubes, which contain vehicle (1% DMSO) or varying concentrations of a compound of interest, and incubated at room temperature for at least 30 minutes. The chemotaxis assay is performed in ChemoTx™ 101-8, 96 well plates (Neuro Probe, Inc. Gaithersburg, MD). The bottom wells of the plate are filled with medium containing 0-10 nM of C5a, preferably derived from the same species of mammal as are the neutrophils or other cells (e.g., human C5a for the human U937 cells). The top wells of the plate are filled with cell suspensions (compound or vehicle-treated). The plate is then placed in a tissue culture incubator for 60 minutes. The top surface of the plate is washed with PBS to remove excess cell suspension. The number of cells that have migrated into the bottom well is then determined using a fluorescence reader. Chemotaxis index (the ratio of migrated cells to total number of cells loaded) is then calculated for each compound concentration to determine an IC<sub>50</sub> value.

As a control to ensure that cells retain chemotactic ability in the presence of the compound of interest, the bottom wells of the plate may be filled with varying concentrations chemo-attractants that do not mediate chemotaxis via the C5a receptor, e.g. zymosan-activated serum (ZAS), N-formylmethionyl-leucyl-phenylalanine (FMLP) or leukotriene B<sub>4</sub> (LTB<sub>4</sub>), rather than C5a, under which conditions the compounds of the invention preferably do not inhibit chemotaxis.

Preferred compounds of the invention exhibit IC<sub>50</sub> values of less than 1  $\mu$ M in the above assay for C5a mediated chemotaxis.

### **Example 13**

#### **Determination of dopamine D<sub>4</sub> receptor binding activity**

The following assay is a standard assay for determining the binding affinity of compounds to dopamine D<sub>4</sub> receptors.

Pellets of Chinese hamster ovary (CHO) cells containing recombinantly expressing primate dopamine D<sub>4</sub> receptors are used for the assays. The dopamine D<sub>4</sub> receptor expression vector may be the pCD-PS vector described by Van Tol et al. (Nature (1991) 358: 149-152). The sample is homogenized in 100 volumes (w/vol) of 0.05 M Tris HCl buffer containing 120 mM NaCl, 5 mM MgCl<sub>2</sub> and 1 mM EDTA at 4°C and pH 7.4. The sample is then centrifuged at 30,000 x g and resuspended and rehomogenized. The sample is then centrifuged as described and the final tissue sample is frozen until use. The tissue is resuspended 1:20 (wt/vol) in 0.05 M Tris HCl buffer containing 120 mM NaCl.

Incubations for dopaminergic binding are carried out at 25°C and contain 0.4 ml of tissue sample, 0.1 nM <sup>3</sup>H-YM 09151-2 (Nemonapride, cis-5-Chloro-2-methoxy-4-(methylamino)-N-(2-methyl-2-(phenylmethyl)-3-pyrrolidiny)benzamide) and the compound of interest in a total incubation of 1.0 ml. Nonspecific binding is defined as that binding found in the presence of 1  $\mu$ M spiperone; without further additions, nonspecific binding is less than 20% of total binding.

### **Example 14. Preparation of radiolabeled probe compounds of the invention**

The compounds of the invention are prepared as radiolabeled probes by

carrying out their synthesis using precursors comprising at least one atom that is a radioisotope. The radioisotope is preferably selected from at least one of carbon (preferably  $^{14}\text{C}$ ), hydrogen (preferably  $^3\text{H}$ ), sulfur (preferably  $^{35}\text{S}$ ), or iodine (preferably  $^{125}\text{I}$ ). Such radiolabeled probes are conveniently synthesized by a radioisotope supplier specializing in custom synthesis of radiolabeled probe compounds. Such suppliers include Amersham Corporation, Arlington Heights, IL; Cambridge Isotope Laboratories, Inc. Andover, MA; SRI International, Menlo Park, CA; Wizard Laboratories, West Sacramento, CA; ChemSyn Laboratories, Lexena, KS; American Radiolabeled Chemicals, Inc., St. Louis, MO; and Moravsek Biochemicals Inc., Brea, CA.

Tritium labeled probe compounds are also conveniently prepared catalytically via platinum-catalyzed exchange in tritiated acetic acid, acid-catalyzed exchange in tritiated trifluoroacetic acid, or heterogeneous-catalyzed exchange with tritium gas. Such preparations are also conveniently carried out as a custom radiolabeling by any of the suppliers listed in the preceding paragraph using the compound of the invention as substrate. In addition, certain precursors may be subjected to tritium-halogen exchange with tritium gas, tritium gas reduction of unsaturated bonds, or reduction using sodium borotritide, as appropriate.

#### Example 15: Baculoviral Preparations (For C5a Expression)

The human C5a (hC5a) receptor baculoviral expression vector was co-transfected along with BACULOGOLD DNA (BD Pharmingen, San Diego, CA) into Sf9 cells. The Sf9 cell culture supernatant was harvested three days post-transfection. The recombinant virus-containing supernatant was serially diluted in Hink's TNM-FH insect medium (JRH Biosciences, Kansas City) supplemented Grace's salts and with 4.1mM L-Gln, 3.3 g/L LAH, 3.3 g/L ultrafiltered yeastolate and 10% heat-inactivated fetal bovine serum (hereinafter "insect medium") and plaque assayed for recombinant plaques. After four days, recombinant plaques were selected and harvested into 1 ml of insect medium for amplification. Each 1 ml volume of recombinant baculovirus (at passage 0) was used to infect a separate T25 flask

containing  $2 \times 10^6$  Sf9 cells in 5 mls of insect medium. After five days of incubation at 27°C, supernatant medium was harvested from each of the T25 infections for use as passage 1 inoculum.

Two of seven recombinant baculoviral clones were then chosen for a second round of amplification, using 1 ml of passage 1 stock to infect  $1 \times 10^8$  cells in 100 ml of insect medium divided into 2 T175 flasks. Forty-eight hours post infection, passage 2 medium from each 100ml prep was harvested and plaque assayed for titer. The cell pellets from the second round of amplification were assayed by affinity binding as described below to verify recombinant receptor expression. A third round of amplification was then initiated using a multiplicity of infection of 0.1 to infect a liter of Sf9 cells. Forty hours post-infection the supernatant medium was harvested to yield passage 3 baculoviral stock.

The remaining cell pellet is assayed for affinity binding using the "Binding Assays" described by DeMartino et al., 1994, J. Biol. Chem. 269 #20, pp.14446-14450 at page 14447, adapted as follows. Radioligand is 0.005-0.500nM [ $^{125}$ I]C5a (human recombinant), New England Nuclear Corp., Boston, MA; the hC5a receptor-expressing baculoviral cells are used instead of 293 cells; the assay buffer contains 50 mM Hepes pH. 7.6, 1 mM  $\text{CaCl}_2$ , 5 mM  $\text{MgCl}_2$ , 0.1% BSA, pH 7.4, 0.1 mM bacitracin, and 100 KIU/ml aprotinin; filtration is carried out using GF/C WHATMAN filters (presoaked in 1.0% polyethyleneimine for 2 hours prior to use); and the filters are washed twice with 5 mLs cold binding buffer without BSA, bacitracin, or aprotinin.

Titer of the passage 3 baculoviral stock is determined by plaque assay and a multiplicity of infection, incubation time course, binding assay experiment is carried out to determine conditions for optimal receptor expression.

A multiplicity of infection of 0.1 and a 72-hour incubation were the best infection parameters found for hC5a receptor expression in up to 1-liter Sf9 cell infection cultures.



Example 16: Baculoviral Infections

Log-phase Sf9 cells (INVITROGEN Corp., Carlsbad CA), are infected with one or more stocks of recombinant baculovirus followed by culturing in insect medium at 27°C. Infections are carried out either only with virus directing the expression of the hC5a receptor or with this virus in combination with three G-protein subunit-expression virus stocks: 1) rat Ga<sub>i2</sub> G-protein-encoding virus stock (BIOSIGNAL #V5J008), 2) bovine b1 G-protein-encoding virus stock (BIOSIGNAL #V5H012), and 3) human g2 G-protein-encoding virus stock (BIOSIGNAL #V6B003), which may be obtained from BIOSIGNAL Inc., Montreal.

The infections are conveniently carried out at a multiplicity of infection of 0.1:1.0:0.5:0.5. At 72 hours post-infection, a sample of cell suspension is analyzed for viability by trypan blue dye exclusion, and the remaining Sf9 cells are harvested via centrifugation (3000 rpm/ 10 minutes/ 4°C).

Example 17: Purified Recombinant Insect Cell Membranes

Sf9 cell pellets are resuspended in homogenization buffer (10 mM HEPES, 250 mM sucrose, 0.5 µg/ml leupeptin, 2 µg/ml Aprotinin, 200 µM PMSF, and 2.5 mM EDTA, pH 7.4) and homogenized using a POLYTRON homogenizer (setting 5 for 30 seconds). The homogenate is centrifuged (536 x g/ 10 minutes/ 4°C) to pellet the nuclei. The supernatant containing isolated membranes is decanted to a clean centrifuge tube, centrifuged (48,000 X g/ 30 minutes, 4°C) and the resulting pellet resuspended in 30 ml homogenization buffer. This centrifugation and resuspension step is repeated twice. The final pellet is resuspended in ice cold Dulbecco's PBS containing 5 mM EDTA and stored in frozen aliquots at -80°C until needed. The protein concentration of the resulting membrane preparation (hereinafter "P2 membranes") is conveniently measured using a Bradford protein assay (Bio-Rad Laboratories, Hercules, CA). By this measure, a 1-liter culture of cells typically yields 100-150 mg of total membrane protein.

Example 18: Agonist-Induced GTP Binding

Agonist-stimulated GTP- $\gamma$ - $^{35}\text{S}$  binding ("GTP binding") activity can be used to identify agonist and antagonist compounds and to differentiate neutral antagonist compounds from those that possess inverse agonist activity. This activity can also be used to detect partial agonism mediated by antagonist compounds. A compound being analyzed in this assay is referred to herein as a "test compound." Agonist-stimulated GTP binding activity is measured as follows: Four independent baculoviral stocks (one directing the expression of the hC5a receptor and three directing the expression of each of the three subunits of a heterotrimeric G-protein) are used to infect a culture of Sf9 cells as described in Example 16.

Agonist-stimulated GTP binding on purified membranes (prepared as described in Example 17) is assessed using hC5a (Sigma Chemical Co., St. Louis, Missouri, USA) as agonist in order to ascertain that the receptor/G-protein- $\alpha$ - $\beta$ - $\gamma$  combination(s) yield a functional response as measured by GTP binding.

P2 membranes are resuspended by Dounce homogenization (tight pestle) in GTP binding assay buffer (50 mM Tris pH 7.0, 120 mM NaCl, 2 mM  $\text{MgCl}_2$ , 2 mM EGTA, 0.1% BSA, 0.1 mM bacitracin, 100 KIU/mL aprotinin, 5  $\mu\text{M}$  GDP) and added to reaction tubes at a concentration of 30  $\mu\text{g}$  protein/reaction tube. After adding increasing doses of the agonist hC5a at concentrations ranging from  $10^{-12}$  M to  $10^{-6}$  M, reactions are initiated by the addition of 100 pM GTP  $\gamma$ - $^{35}\text{S}$ . In competition experiments, non-radiolabeled test compounds (e.g., compounds of the invention) are added to separate assays at concentrations ranging from  $10^{-10}$  M to  $10^{-5}$  M along with 10 nM hC5a to yield a final volume of 0.25 mL.

Neutral antagonists are those test compounds that reduce the C5a-stimulated GTP binding activity towards, but not below, baseline (the level of GTP bound by membranes in this assay in the absence of added C5a or other agonist and in the further absence of any test compound).

In contrast, in the absence of added C5a certain preferred compounds of the invention will reduce the GTP binding activity of the receptor-containing membranes below baseline, and are thus characterized as inverse agonists. If a test compound that displays antagonist activity does not reduce the GTP binding activity below baseline in the absence of the C5a agonist, it is characterized as a neutral antagonist.

An antagonist test compound elevates GTP binding activity above baseline in the absence of added hC5a in this GTP binding assay is characterized as having partial agonist activity. Preferred antagonist compounds of the invention do not elevate GTP binding activity under such conditions more than 10% above baseline, preferably not more than 5% above baseline, and most preferably not more than 2% above baseline.

Following a 60-minute incubation at room temperature, the reactions are terminated by vacuum filtration over GF/C filters (pre-soaked in wash buffer, 0.1% BSA) followed by washing with ice-cold wash buffer (50 mM Tris pH 7.0, 120mM NaCl). The amount of receptor-bound (and thereby membrane-bound) GTP  $\gamma$ - $^{35}\text{S}$  is determined by measuring the bound radioactivity, preferably by liquid scintillation spectrometry of the washed filters. Non-specific binding is determined using 10 mM GTP  $\gamma$ - $^{35}\text{S}$  and typically represents less than 5 percent of total binding. Data is expressed as percent above basal (baseline). The results of these GTP binding experiments may be conveniently analyzed using SIGMAPLOT software (SPSS Inc., Chicago, Illinois, USA).

#### EXAMPLE 19 Calcium Mobilization Assays

##### A. Response to C5a

U937 cells are grown in differentiation media (1 mM dibutyl cAMP in RPMI 1640 medium containing 10% fetal bovine serum) for 48 hrs at 37 °C then reseeded onto 96-well plates suitable for use in a FLIPR™ Plate Reader (Molecular Devices Corp., Sunnyvale CA). Cells are grown an additional 24 hours (to 70-90%

confluence) before the assay. The cells are then washed once with Krebs Ringer solution. Fluo-3 calcium sensitive dye (Molecular Probes, Inc. Eugene, OR) is added to 10 ug/mL and incubated with the cells at room temperature for 1 to 2 hours. The 96 well plates are then washed to remove excess dye. Fluorescence responses, measured by excitation at 480 nM and emission at 530 nM, are monitored upon the addition of human C5a to the cells to a final concentration of 0.01-30.0 nM, using the FLIPR™ device (Molecular Devices). Differentiated U937 cells typically exhibit signals of 5,000-50,000 Arbitrary Fluorescent Light Units in response to agonist stimulation.

#### B. Assays for Determination of ATP Responses

Differentiated U937 cells (prepared and tested as described above under "A. Response to C5a") are stimulated by the addition of ATP (rather than C5a) to a final concentration of 0.01 to 30 uM. This stimulation typically triggers a signal of 1,000 to 12,000 arbitrary fluorescence light units. Certain preferred compounds of the invention produce less than a 10%, preferably less than a 5%, and most preferably less than a 2% alteration of this calcium mobilization signal when this control assay is carried out in the presence or absence of the compounds.

#### C. Assays for the Identification of Receptor Modulatory Agents: Antagonists and Agonists

Those of skill in the art will recognize that the calcium mobilization assay described above may be readily adapted for identifying test compounds as having agonist or antagonist activity, at the human C5a receptor.

For example, in order to identify antagonist compounds, differentiated U937 cells are washed and incubated with Fluo-3 dye as described above. One hour prior to measuring the fluorescence signal, a subset of the cells is incubated with a 1 M concentration of at least one compound to be tested. The fluorescence response upon the subsequent addition of 0.3 nM (final concentration) human recombinant

C5a is monitored using the FLIPR™ plate reader. Antagonist compounds elicit at least a 2-fold decrease in the fluorescence response relative to that measured in the presence of human C5a alone. Preferred antagonist compounds elicit at least a 5-fold, preferably at least a 10-fold, and more preferably at least a 20-fold decrease in the fluorescence response relative to that measured in the presence of human C5a alone. Agonist compounds elicit an increase in fluorescence without the addition of C5a, which increase will be at least partially blocked by a known C5a receptor antagonist.

Example 20. Assays to evaluate agonist activity of small molecule C5a receptor antagonists

Preferred compounds of the invention are C5a receptor antagonists that do not possess significant (e.g., greater than 5%) agonist activity in any of the C5a mediated functional assays discussed herein. Specifically, this undesired agonist activity can be evaluated, for example, in the GTP binding assay of Example 18, by measuring small molecule mediated GTP binding in the absence of the natural agonist, C5a. Similarly, in a calcium mobilization assay e.g., that of Example 19, a small molecule compound can be directly assayed for the ability of the compound to stimulate calcium levels in the absence of the natural agonist, C5a. The preferred extent of C5a agonist activity exhibited by compounds of the invention is less than 10%, more preferably less than 5% and most preferably less than 2% of the response elicited by the natural agonist, C5a.

EXAMPLE 21. Expression of a C5a receptor

A human C5a receptor cDNA was obtained by PCR using 1) a forward primer adding a Kozak ribosome binding site and 2) a reverse primer that added no additional sequence, and 3) an aliquot of a Stratagene Human Fetal Brain cDNA library as template. The sequence of the resulting PCR product is set forth as SEQ ID NO:1. The PCR product was subcloned into the cloning vector pCR-Script AMP (STRATAGENE, La Jolla, CA) at the Srf I site. It was then excised using the restriction enzymes EcoRI and NotI and subcloned in the appropriate orientation for

expression into the baculoviral expression vector pBacPAK 9 (CLONTECH, Palo Alto, CA) that had been digested with EcoRI and NotI.

As set forth in the tables appended hereto, R groups do not necessarily correlate with those R groups shown in the text of the specification or in the claims.

The following table 1 (204-313) is a list of preferred 1,2,5 substituted imidazoles of the present invention;

The following table 2 (314-419) is a list of preferred 1,2,4,5 substituted imidazoles of the present invention;

The following table 3 (420-421) is a list of preferred pyrazoles of the present invention;

The following table 4 (422-423) is another list of preferred 1,2,4,5 substituted imidazoles of the present invention;

The following table 5 (424-456) is a list of preferred amides of the present invention; and

The following table 6 (457-458) is a list of preferred amides of the present invention.

#### Additional Aspects of Preferred Compounds of the Invention

The most preferred compounds of the invention are suitable for pharmaceutical use in treating human patients. Accordingly, such preferred compounds do not exhibit single or multiple dose acute or long-term toxicity, mutagenicity (e.g., as determined in a bacterial reverse mutation assay such as an Ames test), teratogenicity, tumorigenicity, or the like, and rarely trigger adverse effects (side effects) when administered at therapeutically effective dosages. For example, preferred compounds of the invention will not prolong heart QT intervals (e.g., as determined by electrocardiography, e.g., in guinea pigs, minipigs or dogs). Therapeutically effective doses or concentrations of such compounds do not cause liver enlargement when fed to or injected into laboratory animals (e.g., mice or rats) and do not promote the release of liver enzymes (e.g., ALT, LDH, or AST) from hepatocytes in vitro or in vivo.

Because side effects are often due to undesirable receptor activation or antagonism, preferred compounds of the invention exert their receptor-modulatory effects with high specificity. This means that they only bind to, activate, or inhibit the activity of certain receptors other than C5a receptors with affinity constants of greater than 100 nanomolar, preferably greater than 1 micromolar, more preferably greater than 10 micromolar and most preferably greater than 100 micromolar. Such receptors preferably are selected from neurotransmitter receptors such as alpha- or beta-adrenergic receptors, muscarinic receptors (particularly m1, m2, or m3 receptors), dopamine receptors, and metabotropic glutamate receptors; and also include histamine receptors and cytokine receptors, e.g., interleukin receptors, particularly IL-8 receptors. Such receptors may also include GABAA receptors, bioactive peptide receptors (other than C5a receptors, including NPY or VIP receptors), neurokinin receptors, bradykinin receptors, hormone receptors (e.g., CRF receptors, thyrotropin releasing hormone receptors, or melanocyte-concentrating hormone receptors).

Additionally, preferred compounds of the invention do not inhibit or induce microsomal cytochrome P450 enzyme activities, such as CYP1A2 activity, CYP2A6 activity, CYP2C9 activity, CYP2C19 activity, CYP2D6 activity, CYP2E1 activity, or CYP3A4 activity. Preferred compounds of the invention also do not exhibit cytotoxicity in vitro or in vivo, are not clastogenic, e.g., as determined using a mouse erythrocyte precursor cell micronucleus assay, an Ames micronucleus assay, a spiral micronucleus assay, or the like and do not induce sister chromatid exchange, e.g., in Chinese hamster ovary cells.

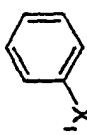

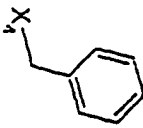
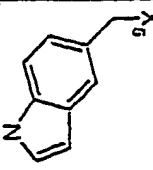
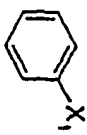

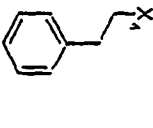
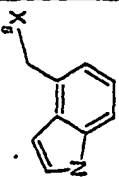
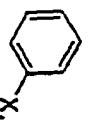

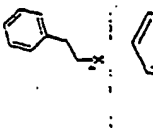
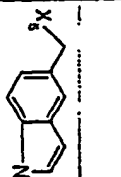
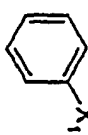

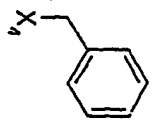
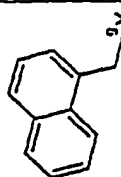
Highly preferred C5a receptor antagonist compounds of the invention also inhibit the occurrence of C5a-induced oxidative burst (OB) in inflammatory cells, e.g., neutrophil, as can be conveniently determined using an in vitro neutrophil OB assay.

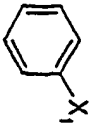

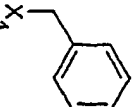
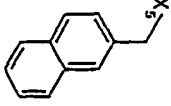
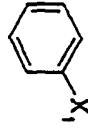

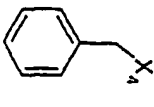
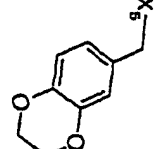
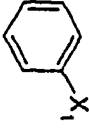

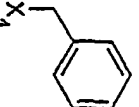
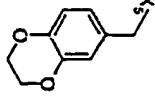
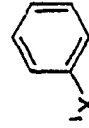

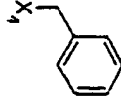
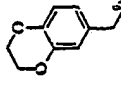
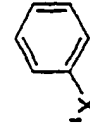
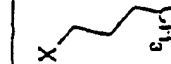
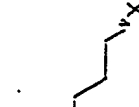
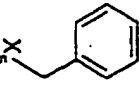
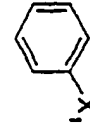
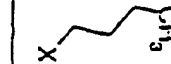
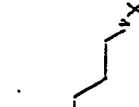
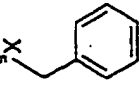
Initial characterization of preferred compounds of the invention can be conveniently carried out using a C5a receptor binding assay or functional assay, such as set forth in the Examples, and may be expedited by applying such assays in

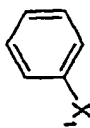
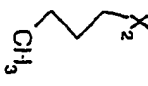
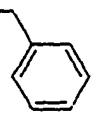
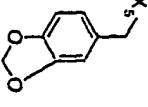
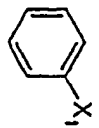
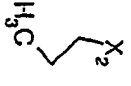
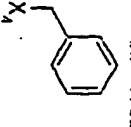
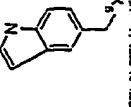
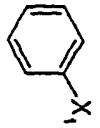
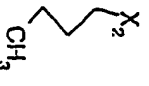
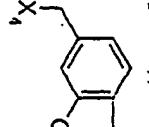
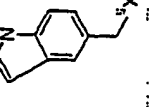
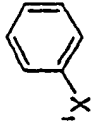

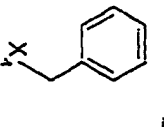
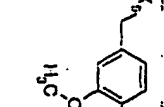
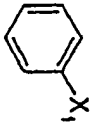

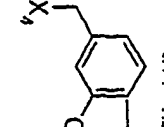
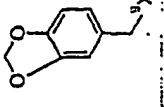
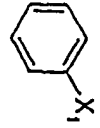
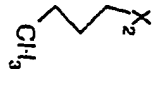

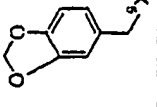
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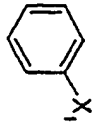
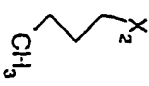
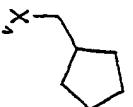
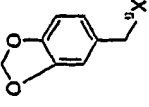
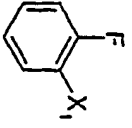
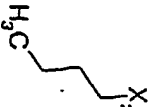
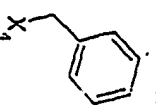
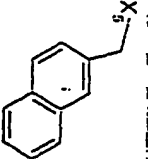
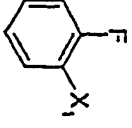
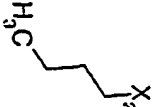
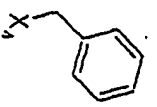
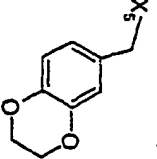
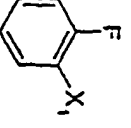

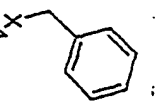
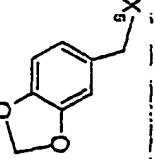
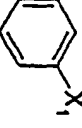

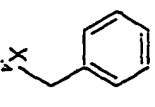
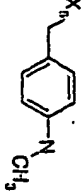
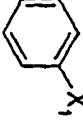

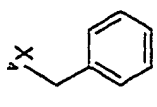
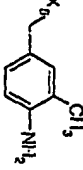
The following Tables depict further preferred compounds of the invention. In those Tables, the variable X indicates the point of attachment of the specified moiety to the structure shown at the top of the Table.



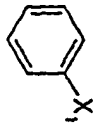
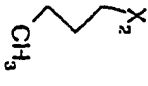
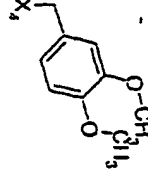
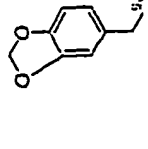
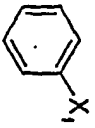
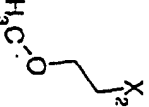
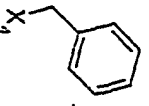
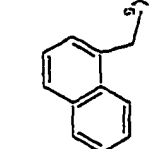
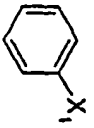
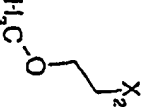
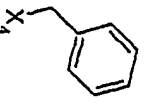
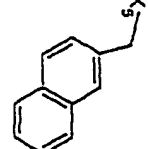
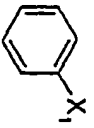
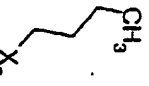
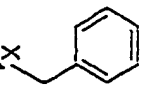
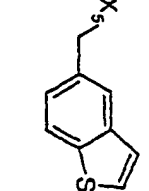
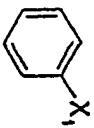

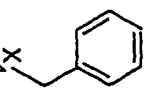
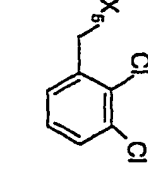
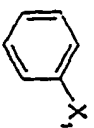

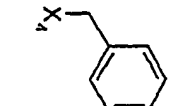
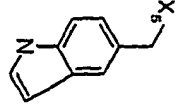
TABLE 1						
CMP II	R1	R2	R3	R4	R5	
200						1.95 448.2627 449.3036
201						1.96 462.2784 463.3201
202						1.91 462.2784 463.3241
203						2.08 460.2076 460.3053

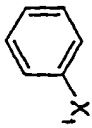

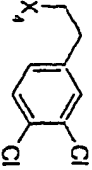
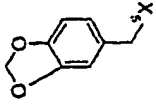
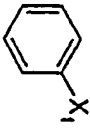

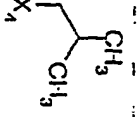
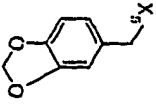
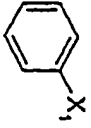

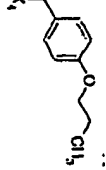
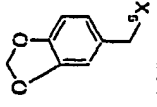
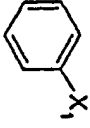
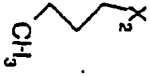
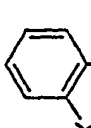
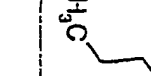

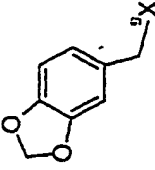
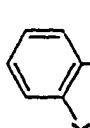


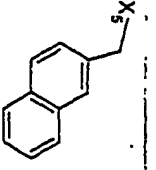
204						2.1	459.2676	460.2983
205						2.04	467.2573	468.2888
206						2.05	401.2729	482.3052
207						2	467.2573	468.2885
208						1.96	453.2416	454.2695
209						1.9	376.2876	376.2897

210						2	453.2416	454.2600
211						1.9	434.247	435.2709
212						1.92	492.2525	493.2912
213						1.94	469.2729	470.2906
214						1.97	497.2314	498.2636
215						2.06	473.3042	474.3346

216						2.03	445.2729	446.302
217						2.1	477.258	478.2953
218						2.01	485.2479	486.2815
219						2.01	471.2322	472.266
220						1.8	438.2704	439.3118
221						1.70	438.2704	439.313

222						1.86	452.294	453.3306
223						2.08	459.2006	460.3148
224						1.99	459.1981	460.220
225						1.86	419.2573	420.2867
226						1.79	405.2416	406.2604
227						2.08	521.1637	522.2009

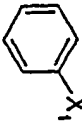

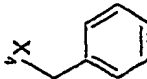
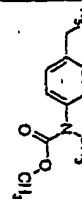
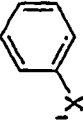

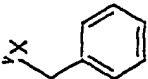
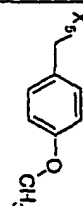
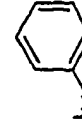
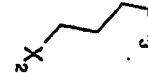
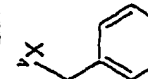
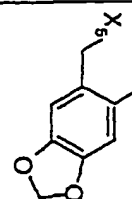
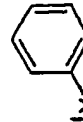
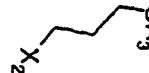
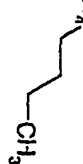
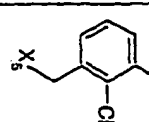
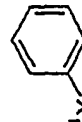
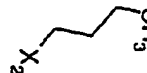
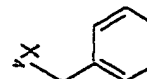
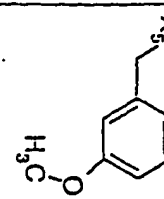
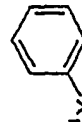
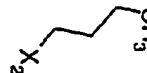
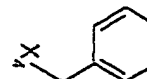
228						1.91	513.2628	514.2851
229						2.02	461.2467	462.2784
230						2	461.2467	462.2892
231						2.05	465.2239	466.267
232						2.1	477.1739	478.2021
233						1.98	462.2764	463.3135

234							
235						2.07	535.1793 536.2415
236						2.11	495.2006 496.3365
237							
238						2	483.2522 484.3027
239						1.87	482.3046 483.3743

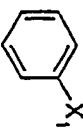

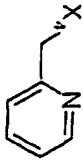
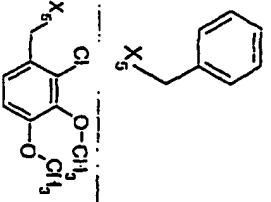
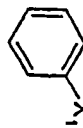
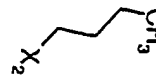
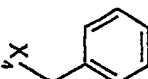
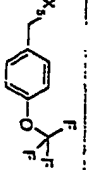
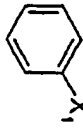
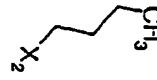
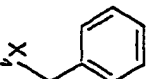
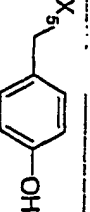
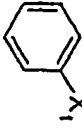
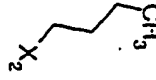
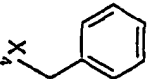
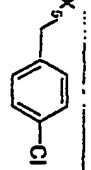
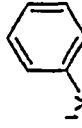
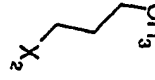
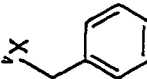
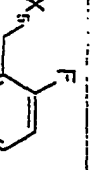
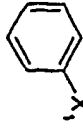
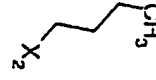
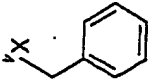
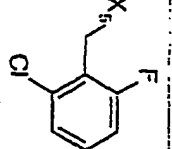
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244						1.98	516.222	516.2016
245						2.01	467.2673	468.3030



246						2	511.2471	612.3024
247						1.99	471.2322	472.2036
248						1.98	515.222	516.2795
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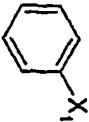
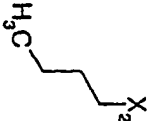
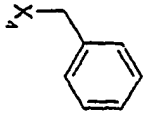
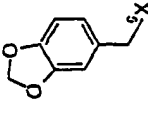
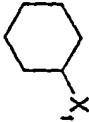
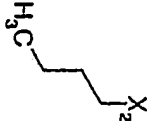
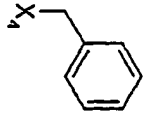
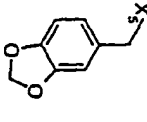
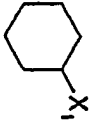
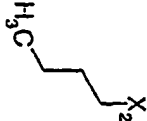
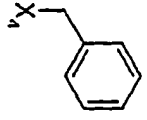
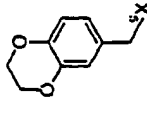
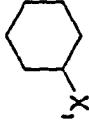
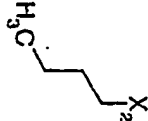
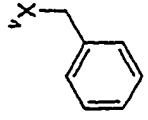
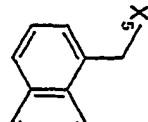
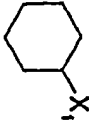

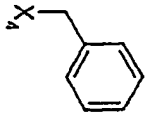
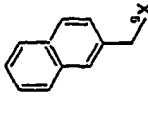
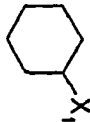
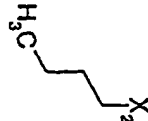
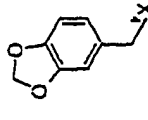
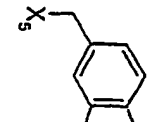
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256					2.1	443.1895	444.2521
257					2	439.2624	440.3050

258					1.78	504.2525	505.3216
259					1.97	459.2077	460.287
260					2.06	477.1739	478.2339
261					2.06	461.2034	462.2581
262							
263					1.76	460.3253	461.4013

264						1.75	410.247	411.2861
265						2.01	603.2339	504.2863
266						2.07	493.2341	494.2873
267						1.88	425.2467	426.2948
268						2.05	443.2128	444.2872
269						2.04	461.2034	462.255

270						2.1	477.1739	478.2429
271						2.06	521.1637	522.2083
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274						1.9	433.2729	434.3161
275						1.74	424.2627	425.298

276						1.98	454.2369	455.2756
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278						1.86	470.2846	471.3502
279						2.07	486.3002	487.375
280						2.02	487.2027	488.2712
281						2.02	501.2183	502.2074

202			$\text{X}_3$ $\text{CH}_3$					
203						2.01	459.2806	460.3366
204						2	473.3042	474.3561
205						2.1	465.3144	466.3708
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207						1.99	503.2764	504.3394

288							
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290						2.07	447.2886 448.3387
291						2.06	481.2729 482.3294
292						2.08	475.3199 476.3839
293						2.11	473.3042 474.361



294					1.76	417.2416	418.2879
295					2.05	423.2675	424.2875
296					2.05	467.2573	468.2819
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298					2.05	467.2573	468.2849
299					2.02	451.2624	452.2898

300						2.02	477.1983	478.2209
301						2.01	477.1983	478.2308
302						1.95	495.2522	496.3082
303						1.99	529.2377	530.2964
304						2.01	485.2479	486.3004
305						2.05	477.2791	478.3398

306								
307						1.99	491.214	492.2748
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309						1.69	425.2579	426.3054
310						1.96	503.1879	504.2485
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312						1.99	451.2293	452.2099
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316						1.81	432.3253	433.3902
317						1.83	450.3159	451.3803

318						1.97	508.2682	507.3284
319						1.95	503.1976	504.2582
320						1.97	535.2030	536.2633
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322						2.08	491.214	492.2753
323						2.02	471.2453	472.317

324						1.92	443.214	444.2721
325						1.90	457.2296	450.2092
326						1.97	457.2296	458.2943
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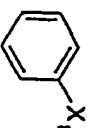
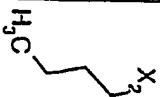
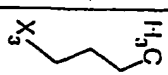
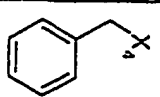
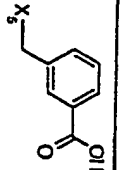
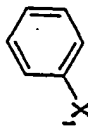
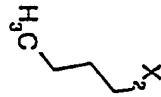
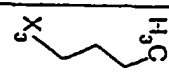
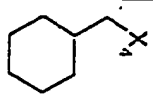
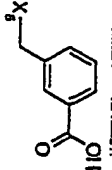
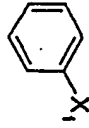
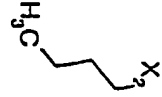
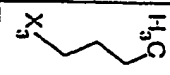
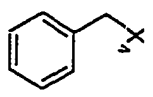
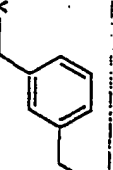
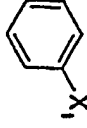
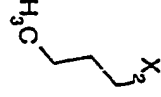
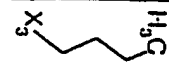
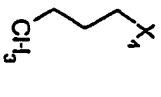
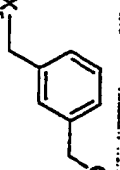
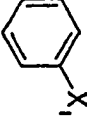
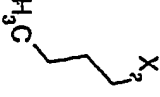
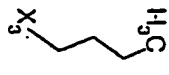
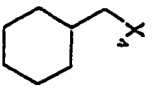
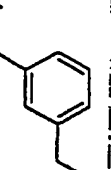
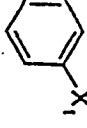
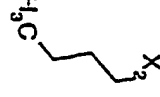
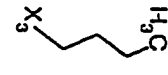
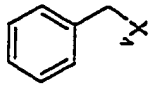
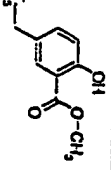
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335						1.96	511.2471	512.298
336						1.95	517.2132	518.2731
337						2.15	521.3173	522.3696
338						2.15	515.3512	516.4249
339						1.08	403.2622	404.3056
340						2.05	407.3563	408.4303



341						2.08	515.3512	516.4047
342						2.05	501.3719	502.4088
343						1.97	467.2573	468.2054
344						1.94	433.2729	434.297
345						2.07	473.3042	474.3316
346						2.01	459.2806	460.3174

347									
348									
349									
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351									
352									

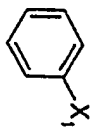
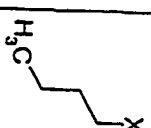
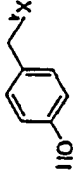
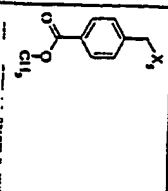
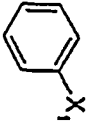

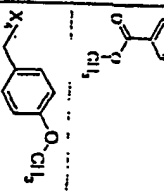
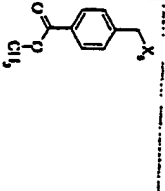
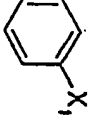
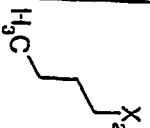
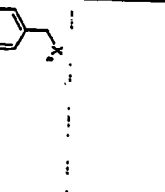
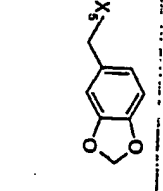
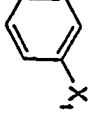
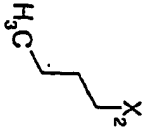
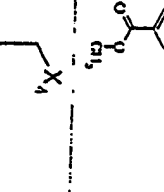
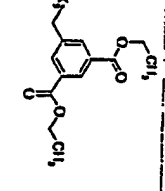
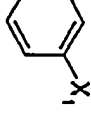
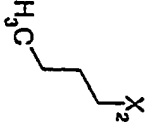
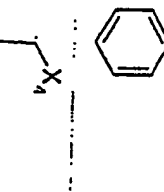
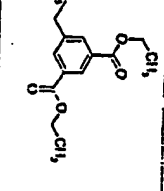
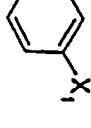
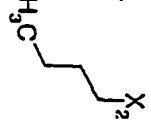
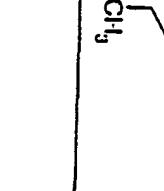

353						2.01	509.3042	510.337
354						2.00	515.3512	516.3034
355								
356								
357						2.07	501.3719	502.3938
358						2.00	539.3140	540.3187

359						2.04	505.3304	506.3531
360						2.16	545.3618	546.3911
361						2	403.2522	404.2723
362						1.93	449.2679	450.2899
363						2.00	489.2801	490.3192
364						2.06	525.2991	526.36

365						2.12	531.3461	532.3955
366						1.95	469.2365	470.2861
367						1.8	435.2522	436.2059
368						2.03	475.2835	476.3151
369						1.94	511.3109	512.3503
370						1.72	477.3355	478.3816

371						1.90	517.3668	510.4061
372						2.02	553.3304	554.3617
373						1.96	519.3461	520.382
374						2.09	559.3774	560.4091
375						1.92	497.2679	490.3003
376						2	503.3148	504.343

377							
378						2	526.3355 526.3682
379						1.01	491.3512 492.3073
380						2.05	531.3025 532.415
381							
382						1.94	476.3190 476.3517

363						1.06	403.2522	484.2405
364						1.94	517.2132	510.2035
305						1.97	497.2079	490.2453
306						1.95	511.2471	512.2275
367						2.06	553.2941	554.2720
380						2.05	519.3097	520.2906



309						2.13	559.341	560.3246
390						1.70	469.2365	470.2361
391						1.08	503.1976	504.1905
392						1.89	403.2522	404.2435
393						1.89	497.2314	498.227
394						1.71	455.2573	456.2570

395						1.84	489.2183	480.22
396						1.85	469.2729	470.2647
397						1.85	483.2522	484.24
398						1.97	531.3025	532.3688
399						2.07	509.3042	510.2907
400						1.99	401.3093	482.3090

401						2.05	515.2703	516.2676
402						2.01	481.3093	482.3063
403						2.03	523.3199	524.3066
404						2.04	523.3199	524.3074
405						1.96	475.3199	476.3177
406						1.79	447.325	448.3324

407						2.02	401.286	492.2077
408						1.88	447.325	440.326
409						1.97	489.3355	490.3298
410						2.01	489.3355	490.3296
411						2.08	485.325	490.3224
412						1.92	461.3476	462.3362

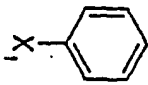

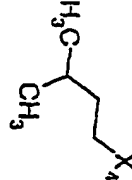
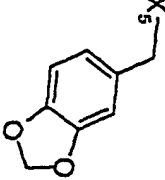
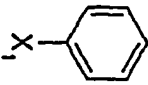

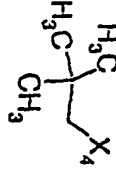
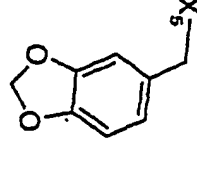


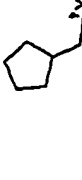


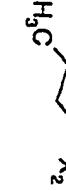
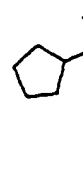
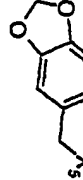
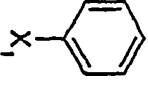


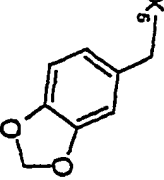

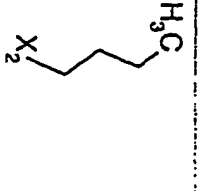
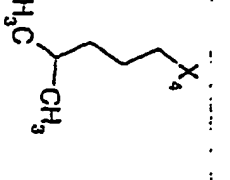
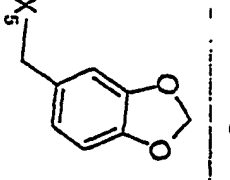
413						2.15	501.3719	502.3614
414						2.1	515.3124	516.3123
415						2.08	495.325	496.3101
416						2.01	461.3406	462.3389
417						2.16	501.3719	502.3629
418								

419								1
420						2.08	514.4036	515.423
421						2.14	515.3512	516.3379
422						2.14	521.3173	522.3266
423								

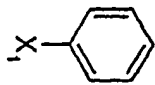


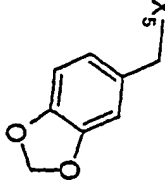
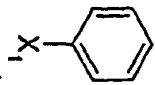

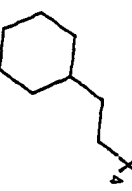
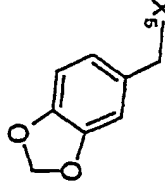
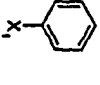

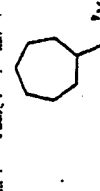
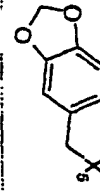
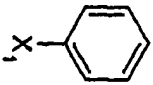

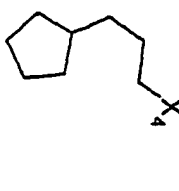
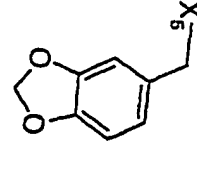
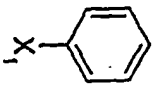


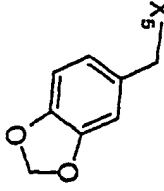
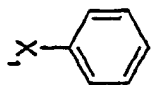

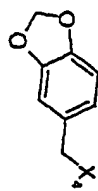
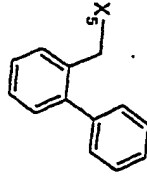
TABLE 1A			R3 is H unless otherwise specified		Rin. Time	Cnd Mass	H+ Ion Obs
CMP #	R1	R2	R4	R5			
424					2.02	427.2424	428.2541
425					2.06	441.258	442.2744
426					2.1	455.2737	456.2899
427					2.08	455.2737	456.2853
428					2.13	469.2893	470.3137

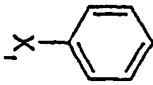

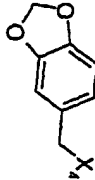
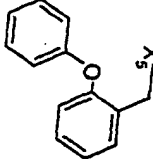
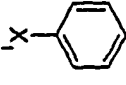

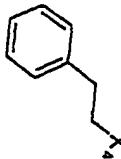
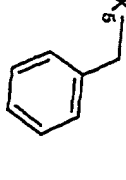


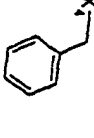

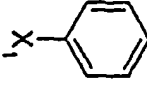

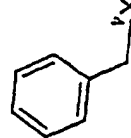
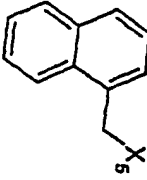


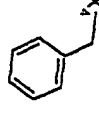
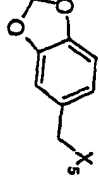


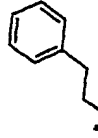
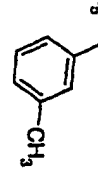

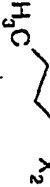
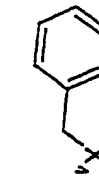
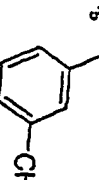
429					2.02	485.2479	486.2833
430					2.15	481.3093	482.332
431							
432					1.98	419.2573	420.2856
433					1.91	431.2573	432.2898
434					1.92	433.2729	434.3079



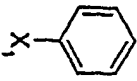


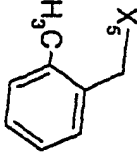
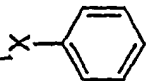

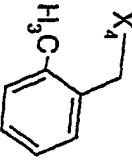
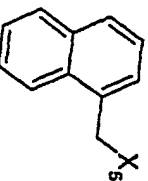


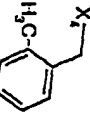
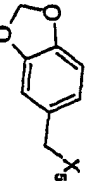


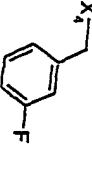
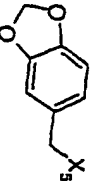
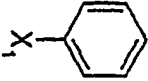

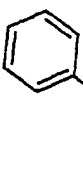
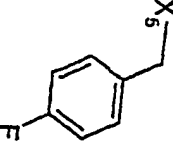



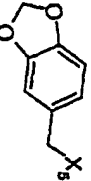
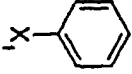

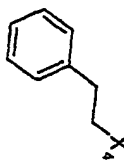
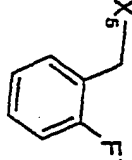
435						1.91	433.2729	434.3078
436						2.04	433.2729	434.3079
437						2.04	401.2831	402.3126
438						2.01	445.2729	446.3118
439						1.99	447.2886	448.329
440						1.98	447.2886	448.3293

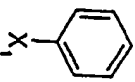


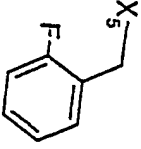
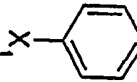

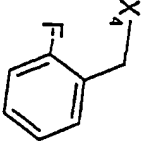
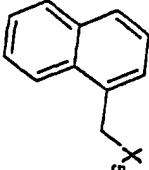
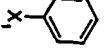

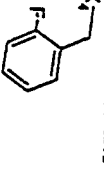
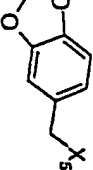
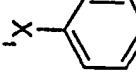

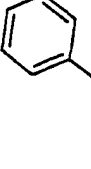
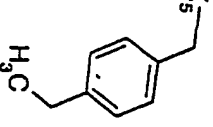
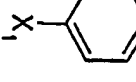


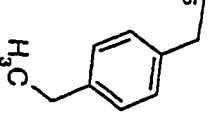
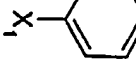

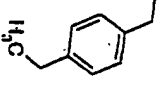
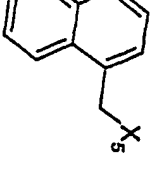
441						1.95	447.2886 1	448.3331
442						2.06	447.2086	448.3315
443						2.09	403.2987	404.3406
444						2.07	447.2886	448.3385
445						1.99	459.2886	460.3416
446						2.07	459.2886	460.3427

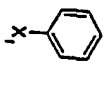
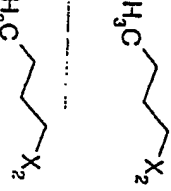

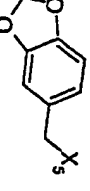
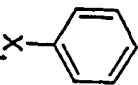
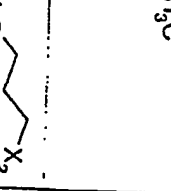
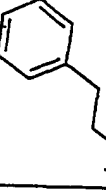
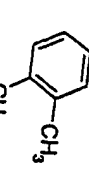
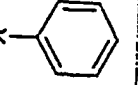
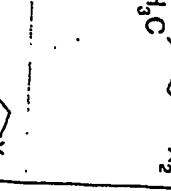

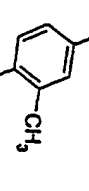
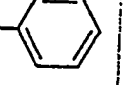
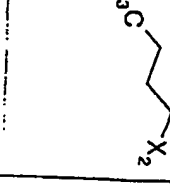
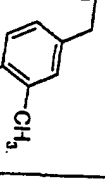
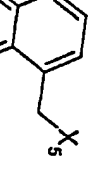
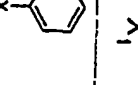
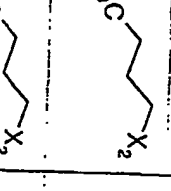
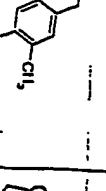
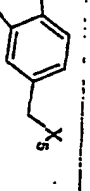
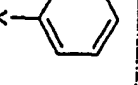
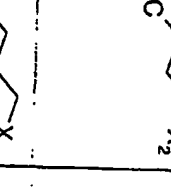
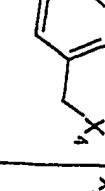

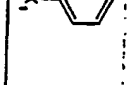

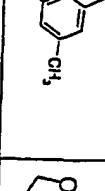
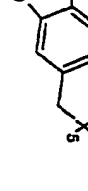
447						2.04	461.3042	462.362
448						2.04	473.3042	474.3634
449						2.12	473.3042	474.3605
450						2.05	473.3042	474.3627
451						2.09	475.3189	476.3831
452						2.09	529.2729	530.334

453						2.09	545,2678	546,3349
454						2.02	423,2675	424,3183
455						2.01	409,2518	410,3021
456						2.07	459,2675	460,326
457						2	453,2416	454,3023
458						2.06	437,2831	438,3368
459						2.05	423,2675	424,318

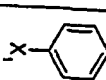

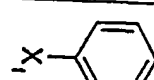

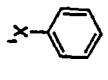

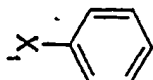

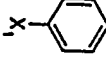

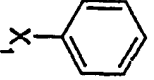

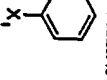

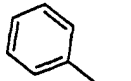

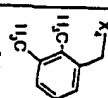
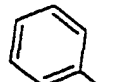

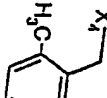
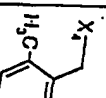
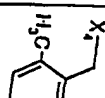
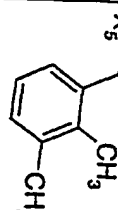
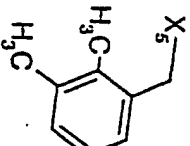
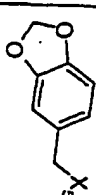
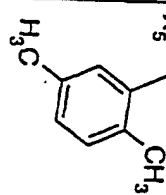
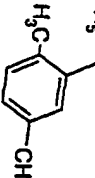
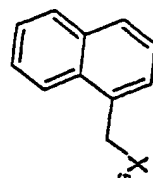
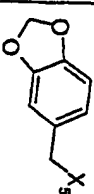
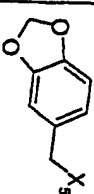
460						2.11	473.2831	474.3436
461						2.04	467.2573	468.3188
462						2.06	437.2831	438.3386
463								
464						2.11	473.2831	474.3485
465						2.03	467.2573	468.3192

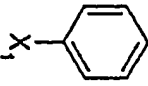

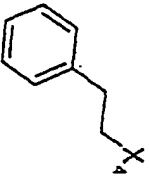
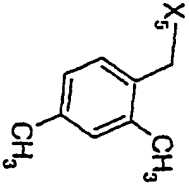
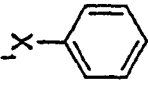


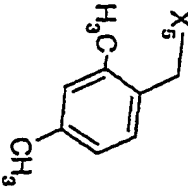
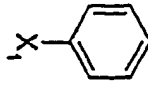

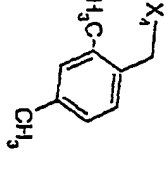
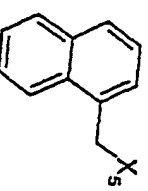


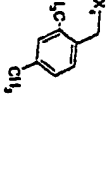
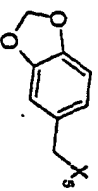
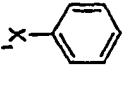

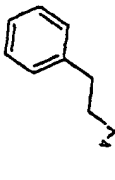
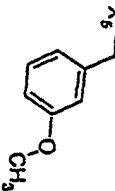
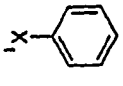

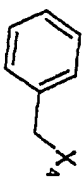
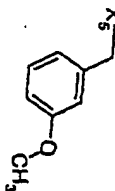
466						2.04	423.2675	424.3211
467						2.1	473.2831	474.3467
468						2.02	467.2573	468.3227
469						1.99	471.2322	472.3021
470						2.02	441.258	442.3175
471						1.98	471.2322	472.3026
472						2.03	441.258	442.3185

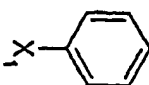

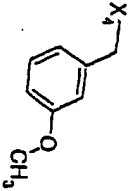
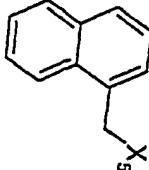
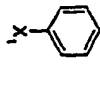

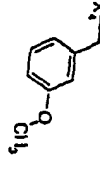
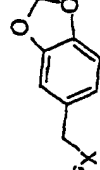
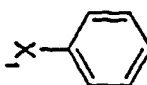

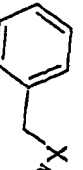
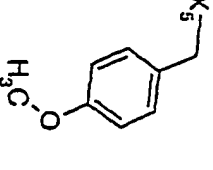
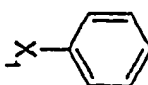

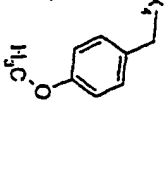
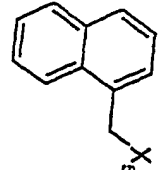
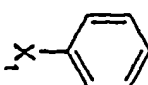

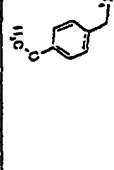
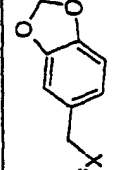


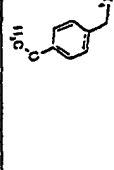
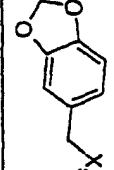
473						2.01	427.2424	428.3031
474						2.07	477.258	478.3228
475						1.99	471.2322	472.3008
476						2.1	451.2987	452.3606
477						2.08	437.2831	438.351
478						2.14	487.2987	488.3652

479						2.07	481.2729	482.3446
480						2.08	451.2987	452.3621
481						2.08	437.2831	438.346
482						2.14	487.2987	488.3646
483						2.06	481.2729	482.3413
484						2.09	437.2831	438.3447
485						2.07	481.2729	482.3401

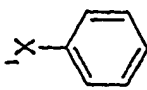

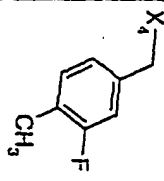
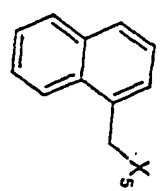


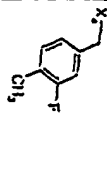
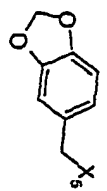
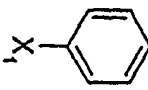

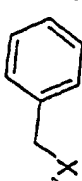
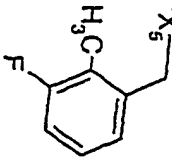


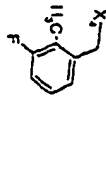
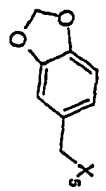
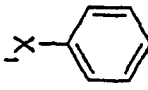

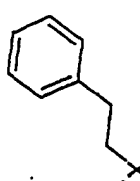
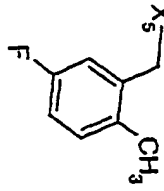
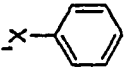


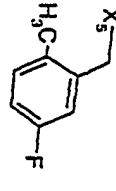
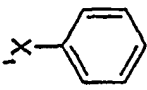

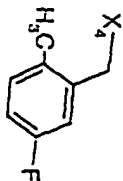
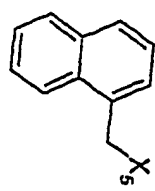


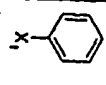

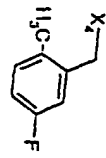
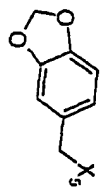
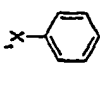

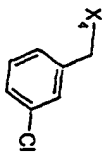
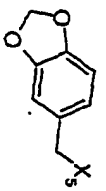
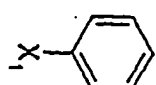

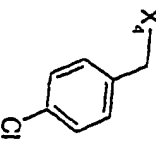
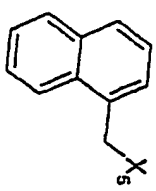
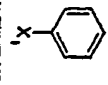

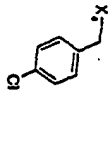
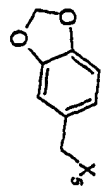
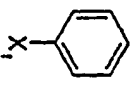

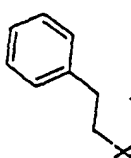
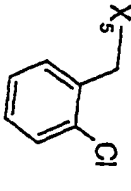
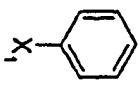

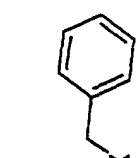
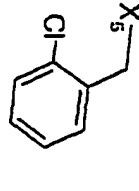
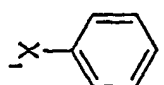
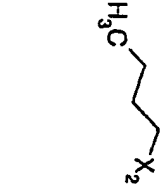
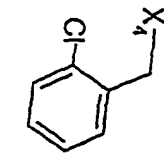
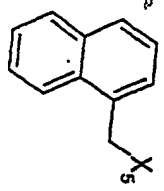
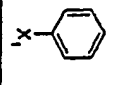

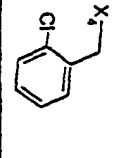
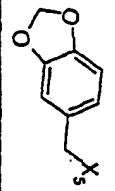
486						
487						
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492						
						
						
						
						
						
						
						
						
	2.07	2.14	2.09	2.11	2.06	2.08
	481.2729	487.2987	437.2831	451.2987	481.2729	437.2831
	482.3416	488.3654	438.3419	452.3647	482.3407	438.3399

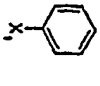

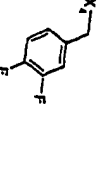
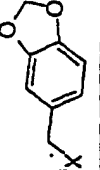
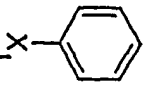

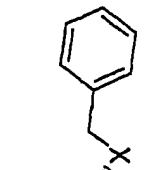
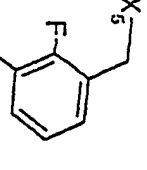
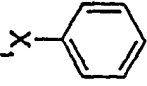

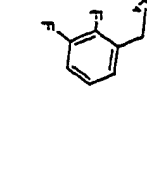
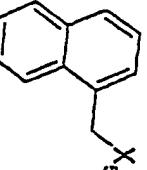


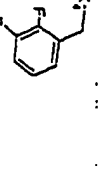
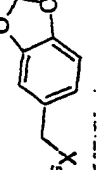
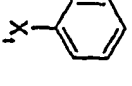

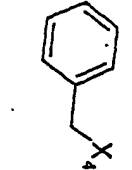
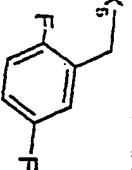
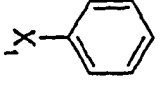

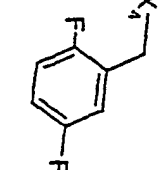
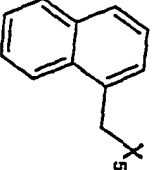


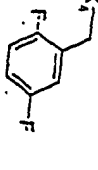
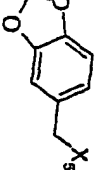
493						2.1	451.2987	452.3654
494						2.09	437.2831	438.3447
495						2.14	487.2987	488.3656
496						2.07	481.2729	482.3421
497						2.02	453.278	454.3456
498						2.01	439.2624	440.3276

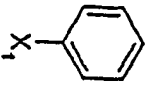

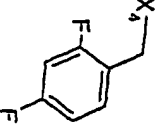
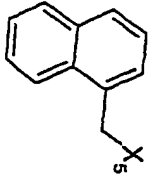


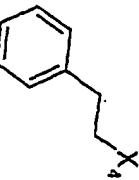
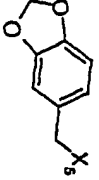
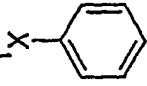
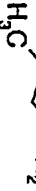

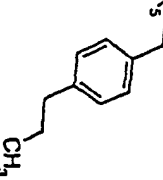
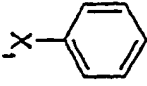

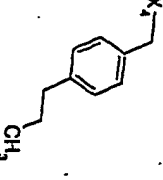
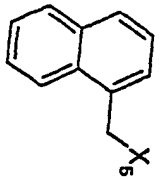
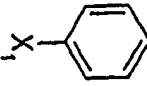
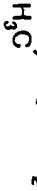
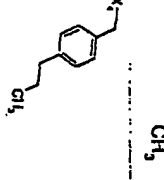
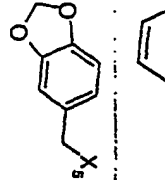
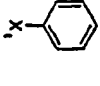

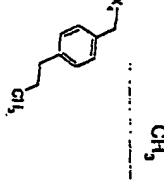
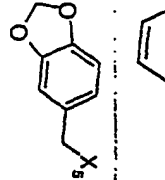
499						2.06	489.278	490.3461
500						1.99	483.2522	484.3252
501						2	453.278	454.3479
502						1.99	439.2624	440.332
503						2.06	489.278	490.3477
504						1.97	483.2522	484.3253

505						1.96	453.278	454.3445
506						1.99	439.2624	440.3253
507						2.07	489.278	490.3457
508						1.97	483.2522	484.3227
509						2.07	455.2737	456.3386
510						2.06	441.258	442.3267

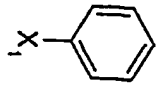

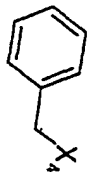
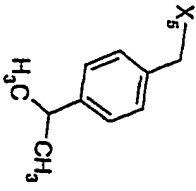
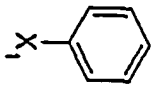

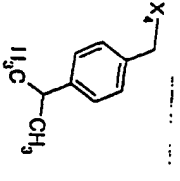
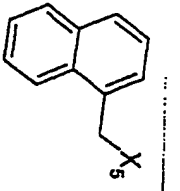
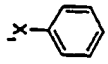

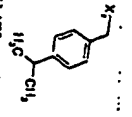
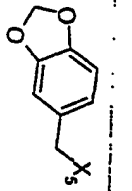


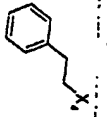
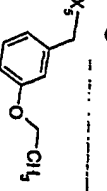


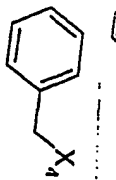
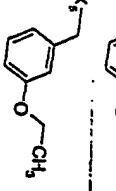
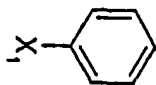

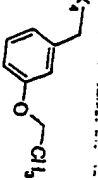
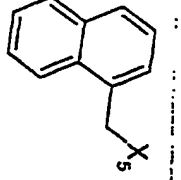


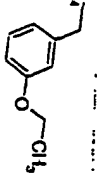
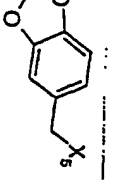
511						2.11	491.2737	492.3441
512						2.04	485.2479	486.3185
513						2.04	441.258	442.3253
514						2.03	485.2479	486.3174
515						2.05	455.2737	456.3376
516						2.04	441.258	442.325
517						2.1	491.2737	492.3412

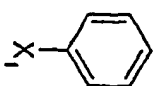

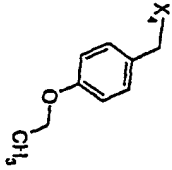
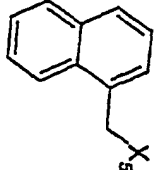
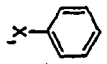

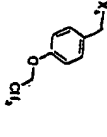
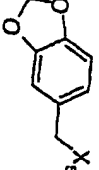
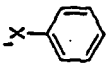

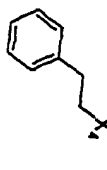
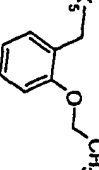
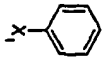

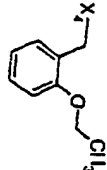
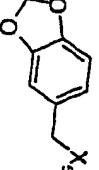
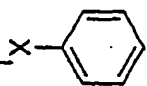

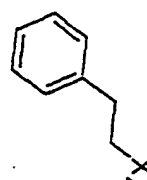
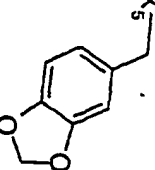
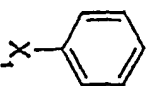

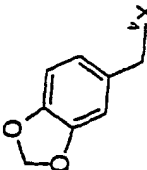
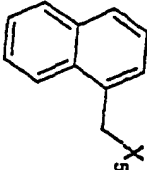
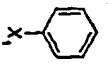

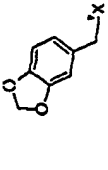
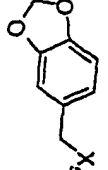
518						2.02	485.2479	486.3193
519						2.04	487.2027	488.2782
520						2.12	493.2285	494.3027
521						2.04	487.2027	488.2797
522						2.06	457.2285	458.2941
523						2.04	443.2128	444.2792
524						2.09	493.2285	494.3003
525						2.03	487.2027	488.278

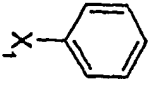

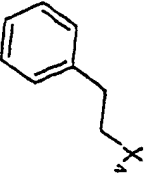
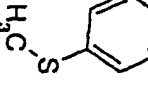
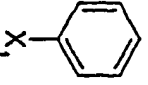

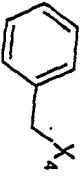
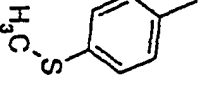
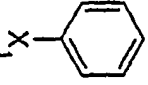

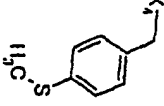
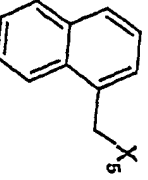

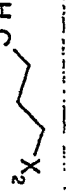
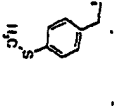
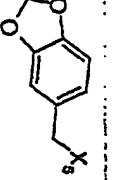
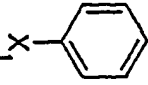

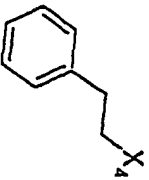
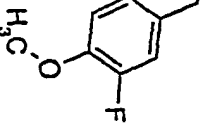
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527						2.02	445,2329	446,2807
528						2.06	495,2486	496,2982
529						2	409,2228	490,2744
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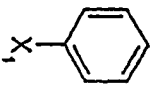


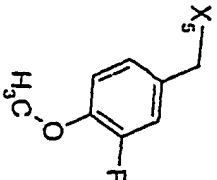
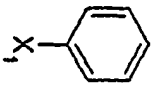

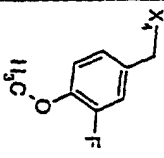
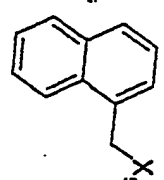
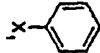

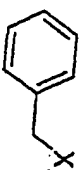
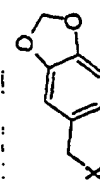
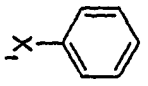

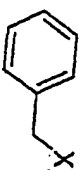
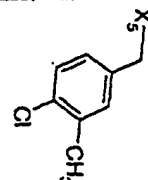
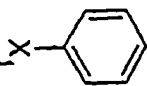

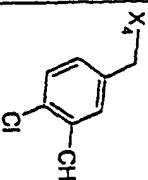
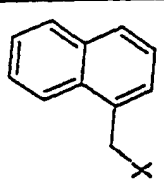


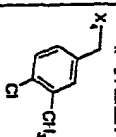
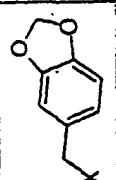
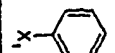

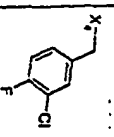
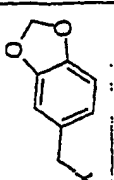
533						2.08	495.2486	496.3038
534						2	489.2228	490.2825
535						2.14	465.3144	466.3682
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538						2.11	495.2886	496.3406

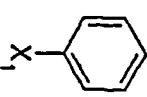

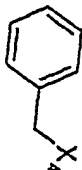
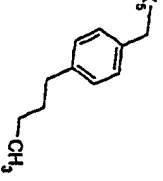
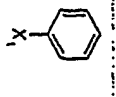

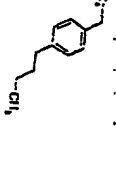
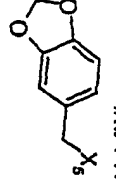
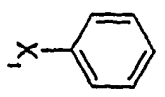

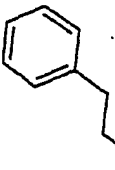
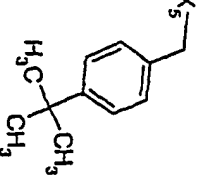
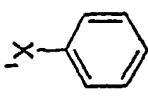

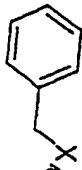
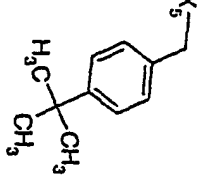
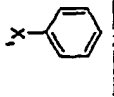

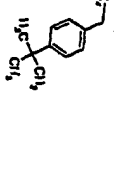
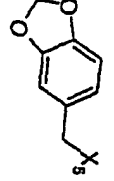
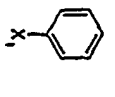

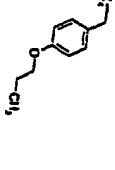
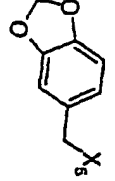
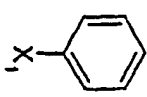

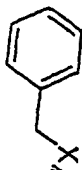
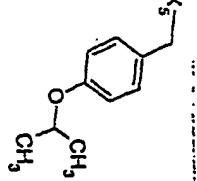


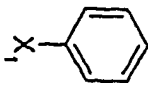

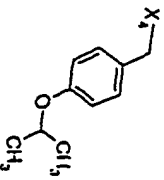
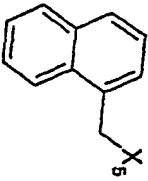

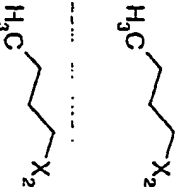
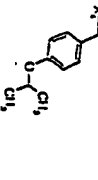
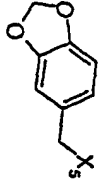
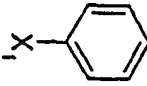

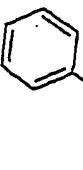
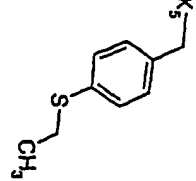
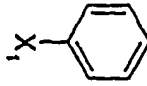

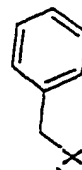
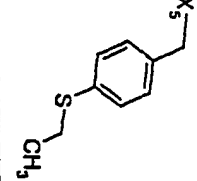
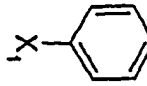

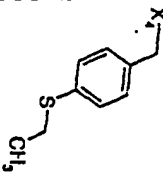
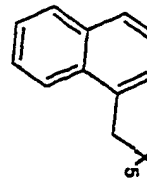


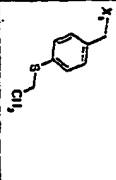
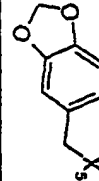
539					2.12	451.2987	452.3553
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541					2.1	495.2886	496.3533
542					2.05	467.2937	468.352
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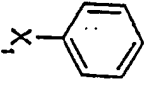

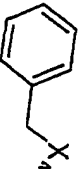
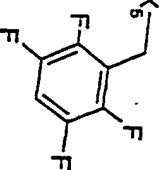
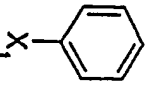

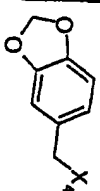
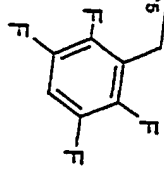
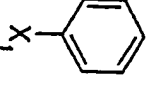

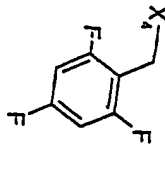
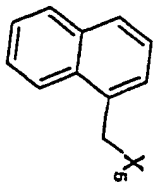
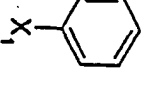

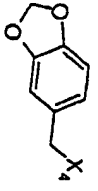
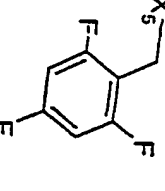
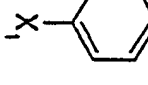

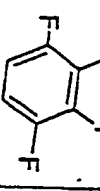
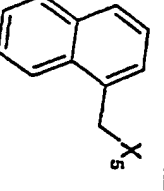
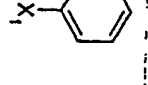
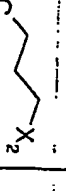
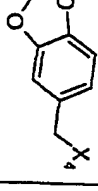
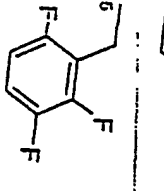
546						2.1	503.2937	504.3604
547						2.01	497.2679	498.336
548						2.02	467.2937	468.3528
549						2.01	497.2679	498.3345
550						1.99	467.2573	468.3251
551						2.05	503.2573	504.3299
552						1.97	497.2314	498.303

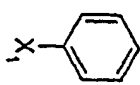


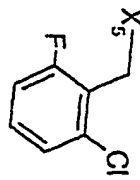
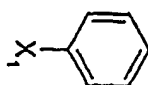

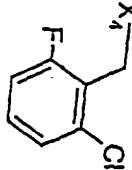
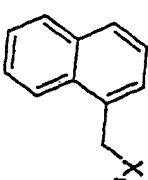
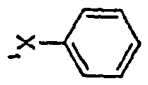

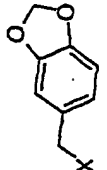
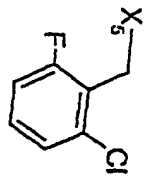
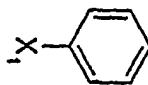

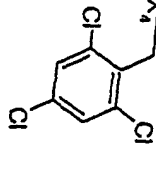
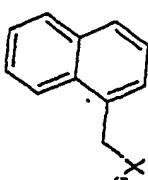
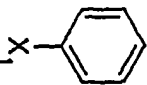

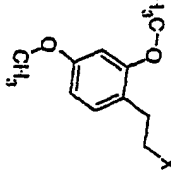
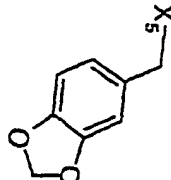
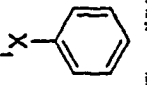
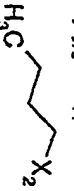
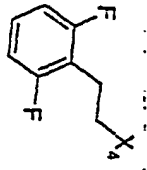
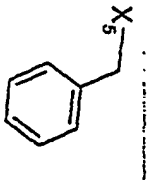
553						2.05	469.2552	470.3185
554						2.05	455.2395	456.3164
555						2.1	505.2552	506.3273
556						2.03	499.2293	500.3005
557						1.99	471.2686	472.3348

558					1.98	457.2529	458.3177
559					2.05	507.2686	508.3424
560					1.96	501.2428	502.3192
561					2.1	457.2285	458.2933
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563					2.08	501.2183	502.2952
564					2.04	505.1932	506.2737

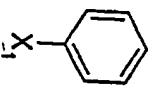

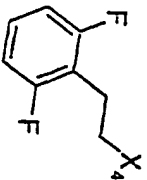
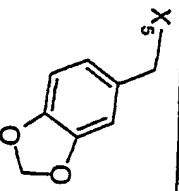
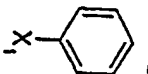

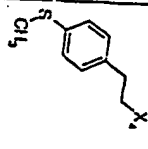
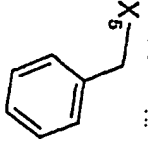
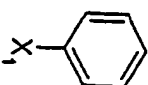

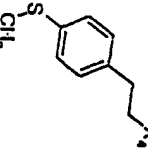
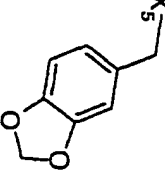
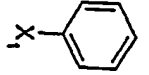

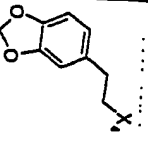
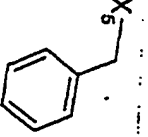
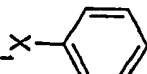

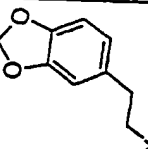
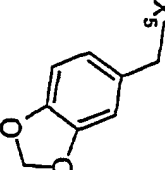
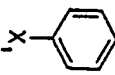

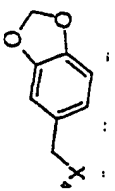
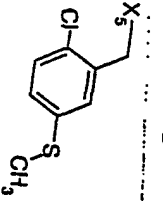
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566						2.15	509.3042	510.3789
567						2.15	479.33	480.3981
568						2.14	465.3144	466.3795
569						2.13	509.3042	510.383
570						2.06	511.2835	512.3632
571						2.06	467.2937	468.3609

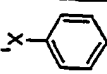

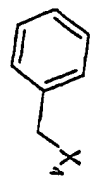
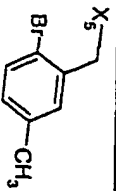
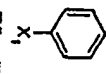

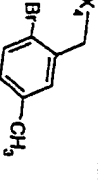
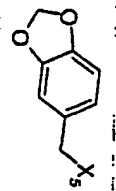
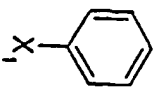

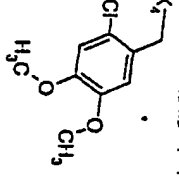
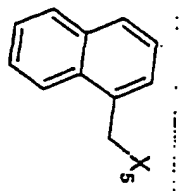
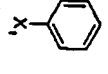

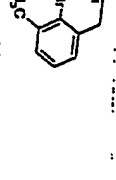
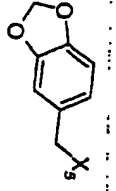
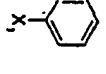

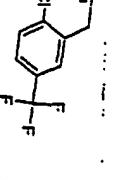
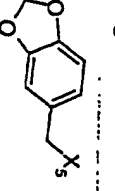
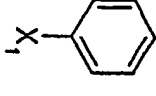

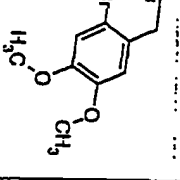
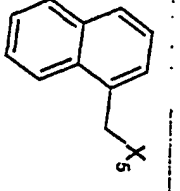
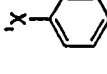

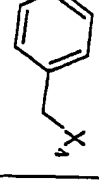
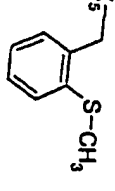
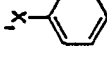

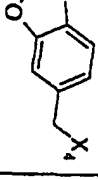
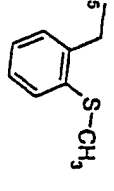
572						2.12	517.3093	518.3871
573						2.04	511.2835	512.3613
574						2.1	483.2708	484.3423
575						2.08	469.2552	470.3222
576						2.13	519.2708	520.3477
577						2.06	513.245	514.3214

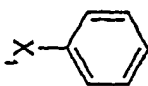

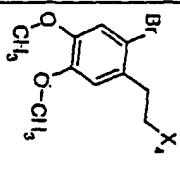
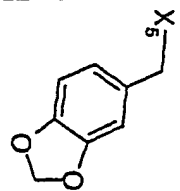
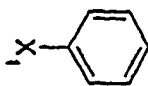

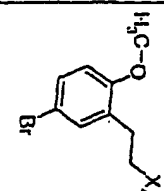
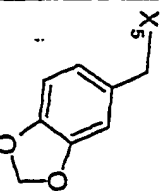
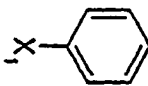

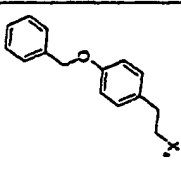
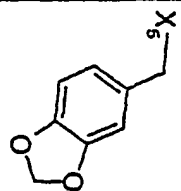
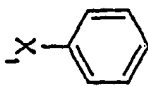

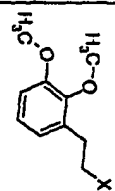
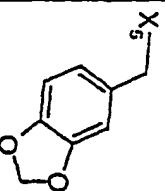
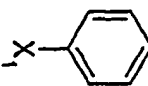

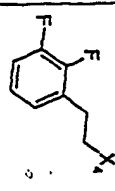
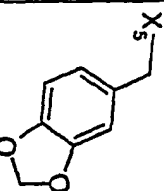
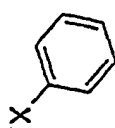

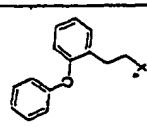
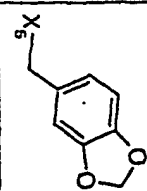
578					2.02	481.2141	482.2768
579					2	525.2039	526.2794
580					2.08	513.2392	514.3017
581					2	507.2133	508.2841
582					2.06	513.2392	514.3171
583					1.98	507.2133	508.2843

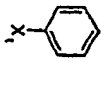
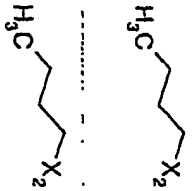
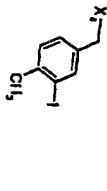
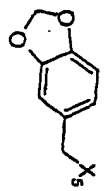
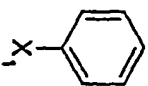
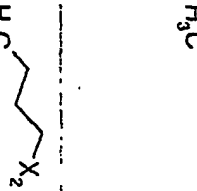
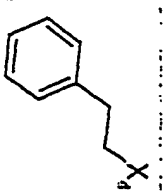
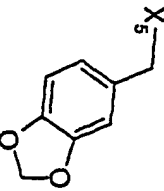
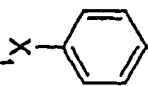
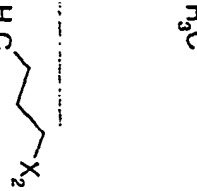
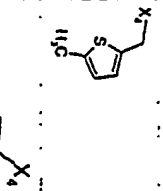
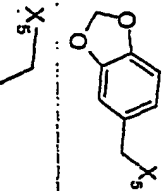
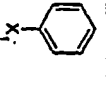
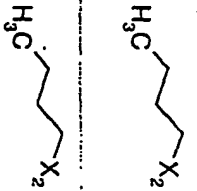
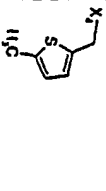
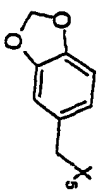
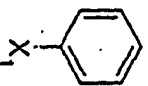
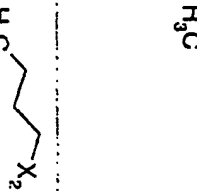
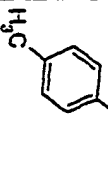
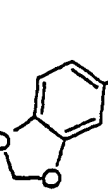
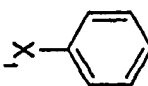
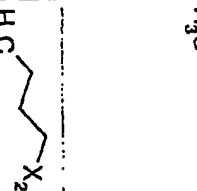
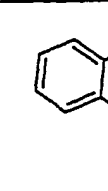
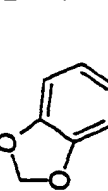
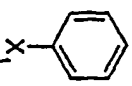

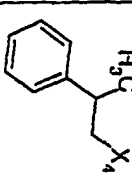
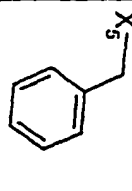
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585						2.08	511,2191	512,2936
586						2.01	505,1932	506,2789
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589						2.02	459,2486	460,326

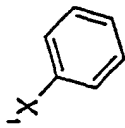

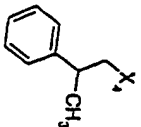
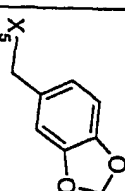
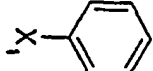

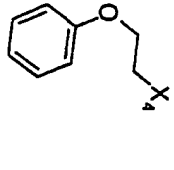
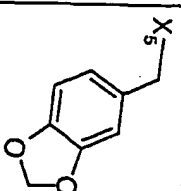
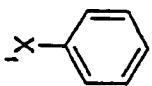

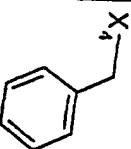
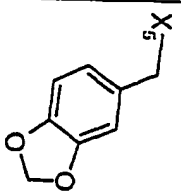
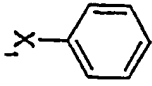

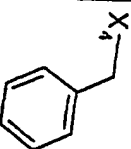
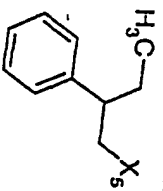
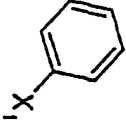

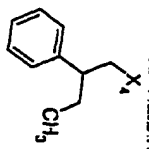
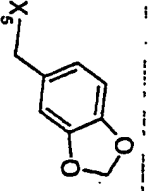
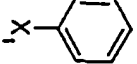

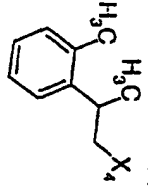
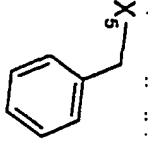


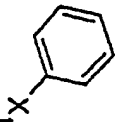

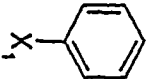
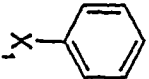
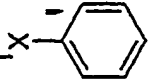

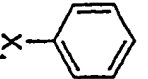
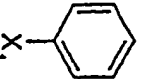
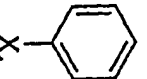

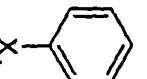
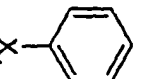




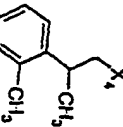
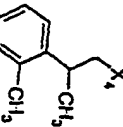
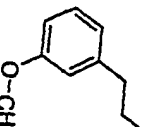
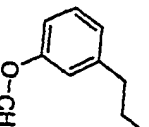
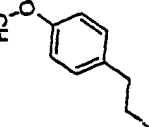
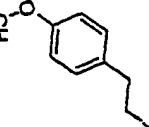
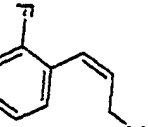
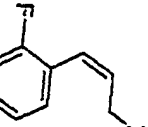
590						2.01	503.2364	504.3166
591						2.06	469.2552	470.3206
592						2.03	513.245	514.321
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594						1.97	511.2471	512.3246
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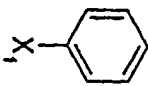

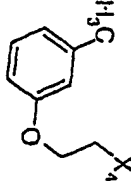
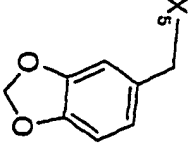
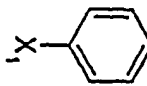

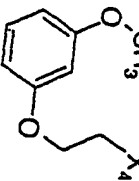
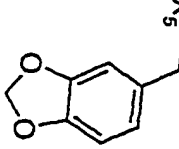
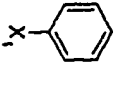

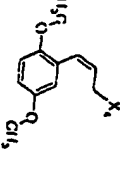
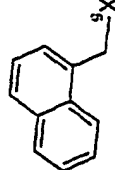
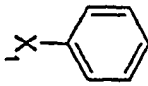

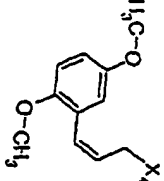
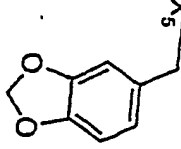
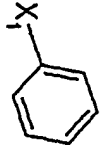
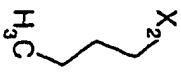
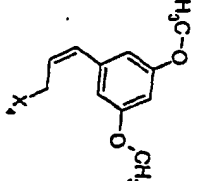
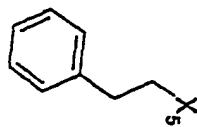
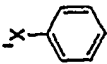

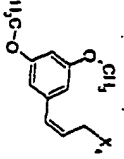
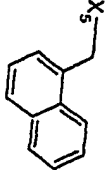
596					2.09	501.1779	502.2556
597					2.08	545.1678	546.2542
598					2.04	553.2496	554.1792
599					2.07	545.1678	546.1213
600					2.05	555.1901	556.1432
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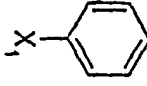

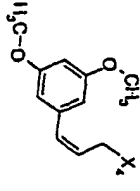
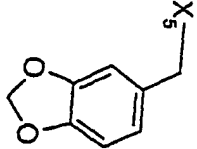
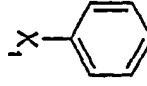

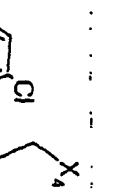
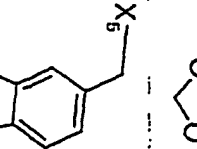
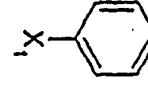
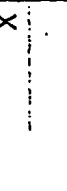
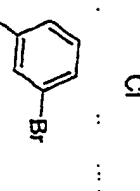
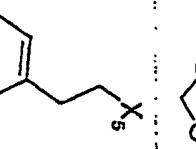
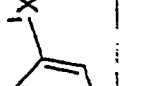


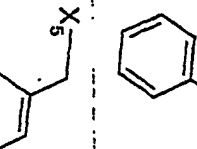
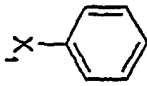

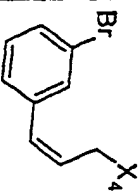
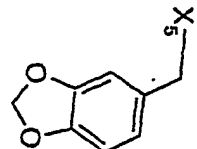
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606						2.09	573.2991	574.2837
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608						2	503.2384	504.2233
609						2.1	559.2835	560.2635

610						2.1	593.1539	594.1388
611						2.07	593.1539	594.146
612						1.99	467.2573	468.2505
613						2.02	473.2137	474.2052
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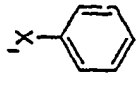

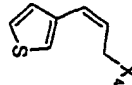
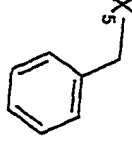
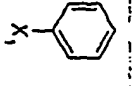
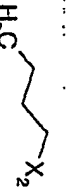
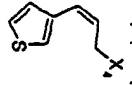
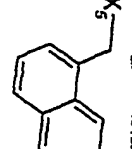
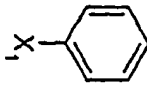

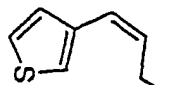
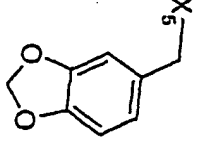
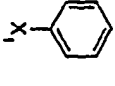

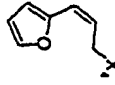
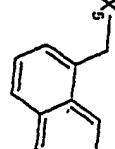
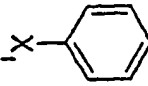

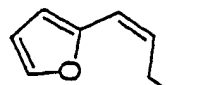
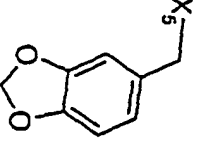
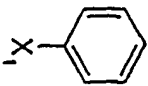

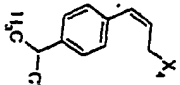
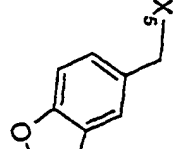
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618						1.98	483.2522	484.2532
619						2	485.2479	486.2474
620						2.08	451.2987	452.2939
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622						2.08	451.2987	452.2961

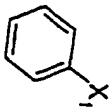

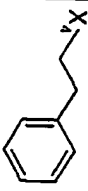
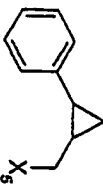
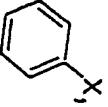

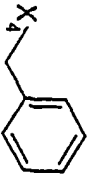
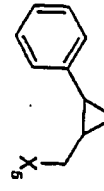
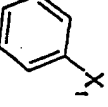

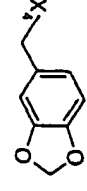
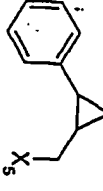
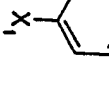


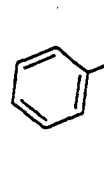
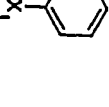


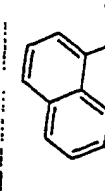
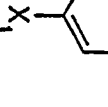


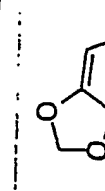
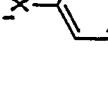
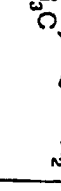

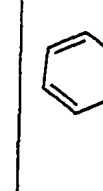
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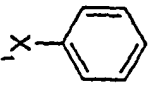

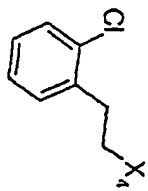
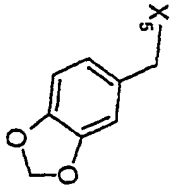
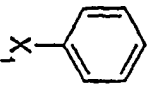

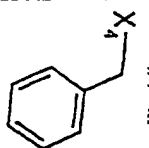
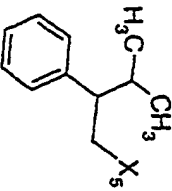
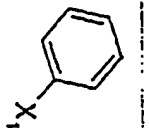
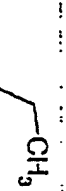
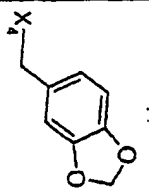
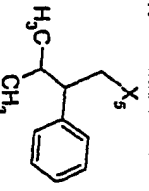
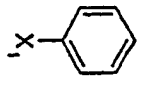

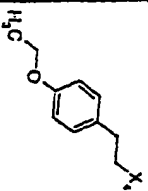
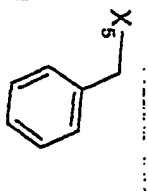
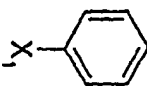

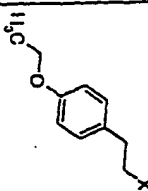
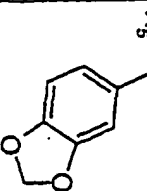
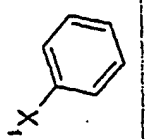
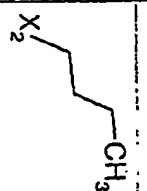
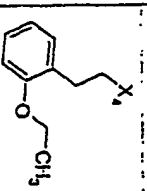
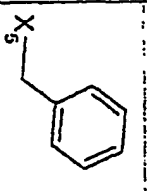
629					2.03	497,2679	498,2339
630					1.98	513,2628	514,2338
631					2.11	545,3042	546,2813
632					1.99	539,2784	540,2627
633					2.01	509,3042	510,2987
634					2.11	545,3042	546,2994

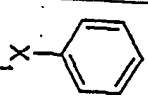
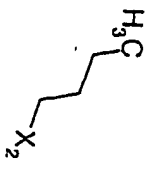
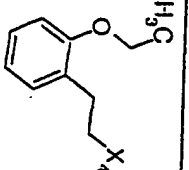
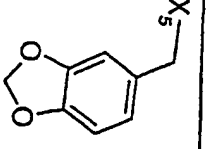
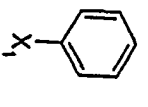

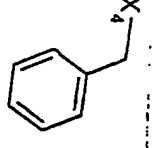
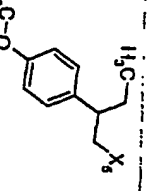
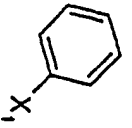
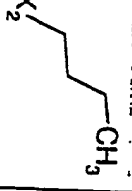
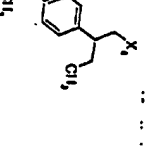
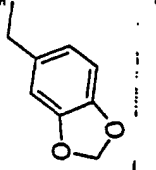
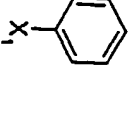

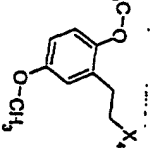
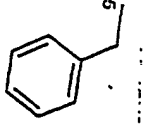
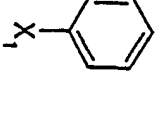

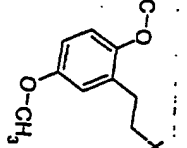
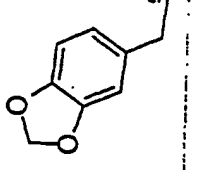
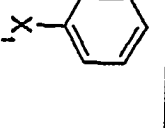
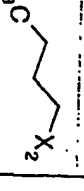
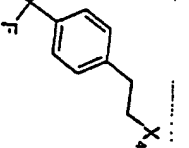
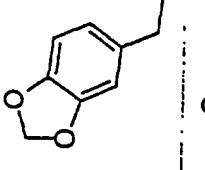
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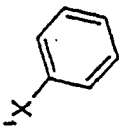
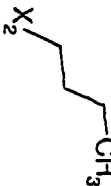
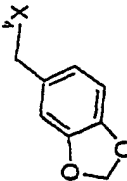
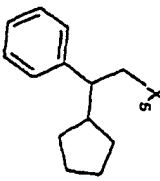
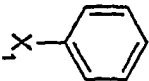

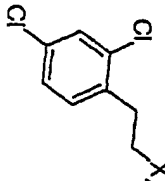
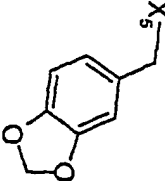
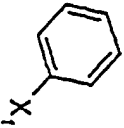

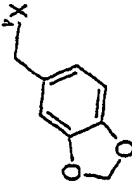
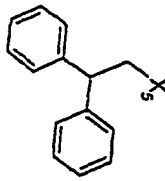
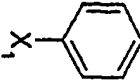

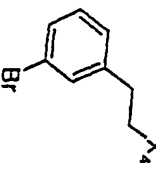
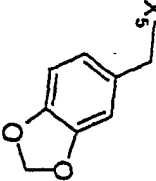
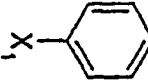

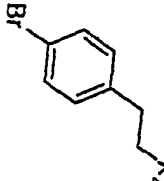
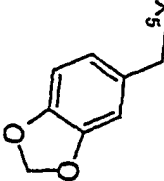
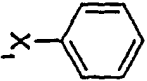

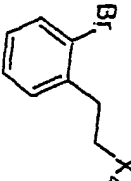
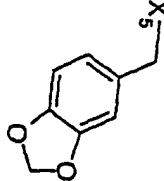


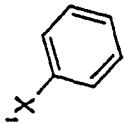

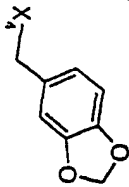
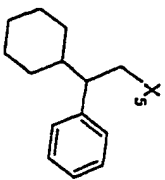
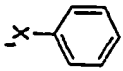
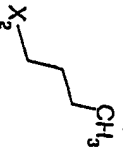
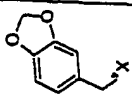
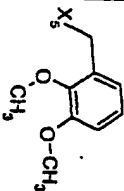
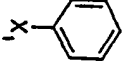
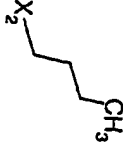
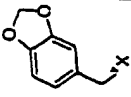
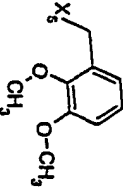
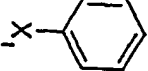
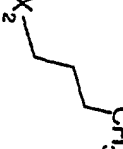
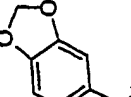
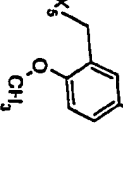
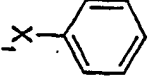
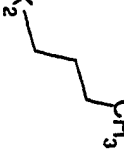
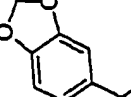
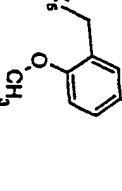
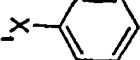
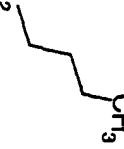
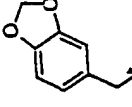
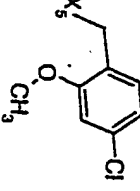
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642						1.97	485.2137	486.2251
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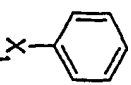

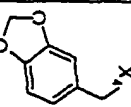
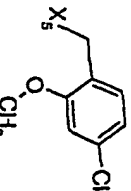
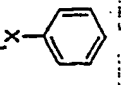
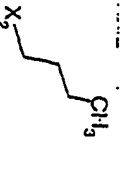
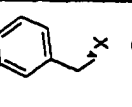
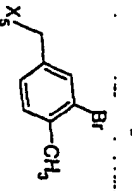
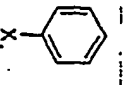

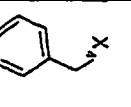
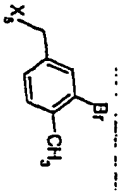
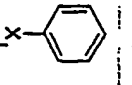
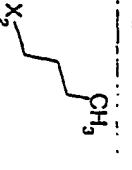
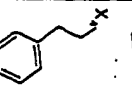
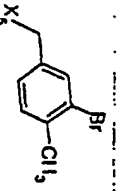
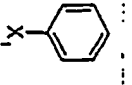
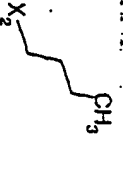
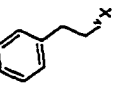
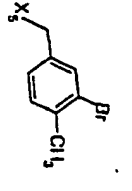

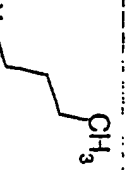
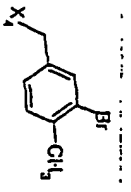
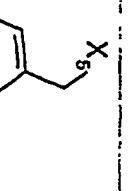
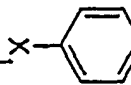
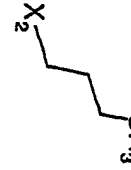
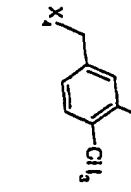
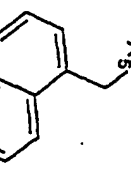
646					2.01	463.2987	464.304
647					2.02	449.2831	450.2887
648					1.99	493.2729	494.2809
649					2.06	453.258	454.2635
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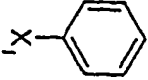
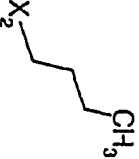
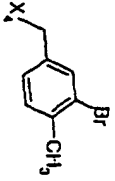
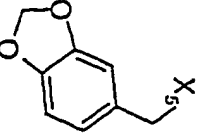
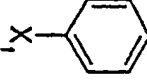
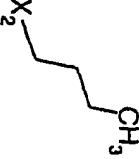
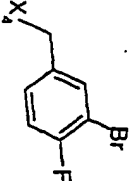
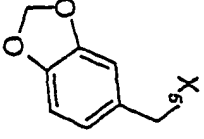
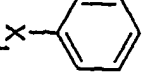

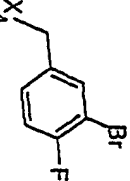
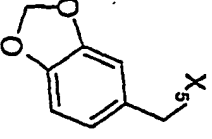
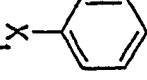
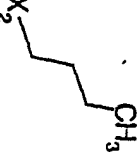
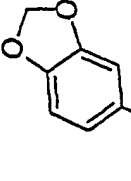
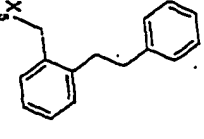


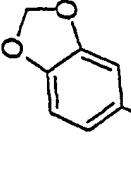
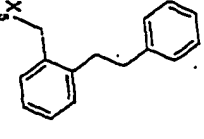
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655						2.1	509.3042	510.315
656						2.04	467.2937	468.3029
657						2.02	511.2835	512.2863
658						2.06	467.2937	468.3049

657						2.04	511.2835	512.2961
660						2.07	481.3093	482.3199
661						2.05	525.2991	526.3086
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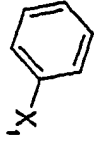

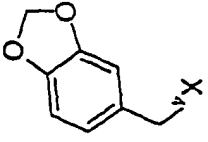
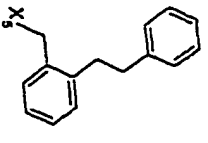
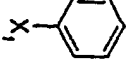
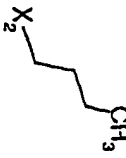
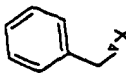
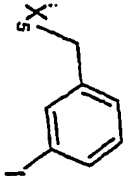
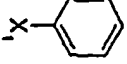
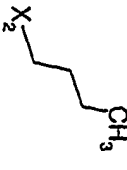
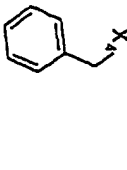
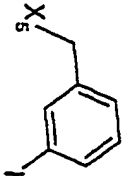
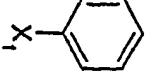
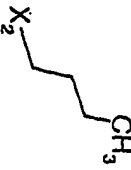
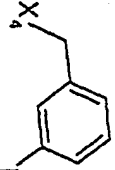
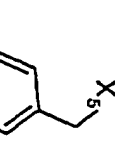
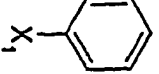
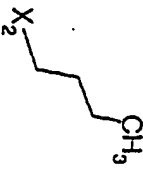
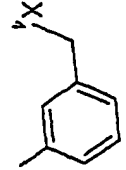
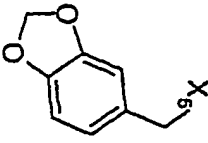
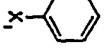
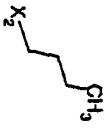
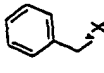
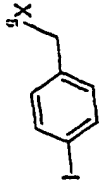
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666								
667						2.07	543.2886	544.3081
668								
669								
670								

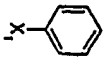
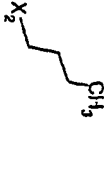
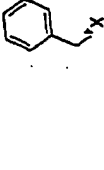
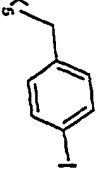
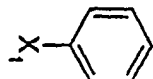
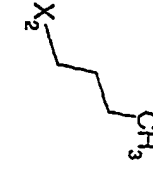
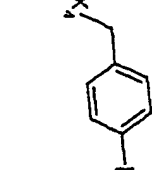
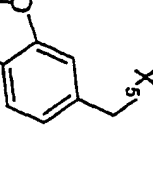
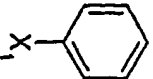
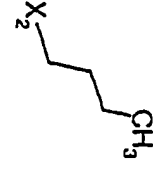
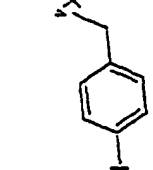
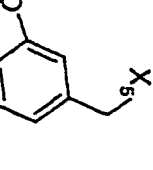
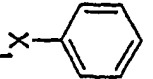
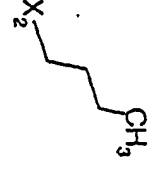
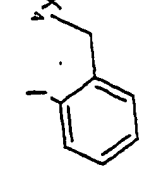
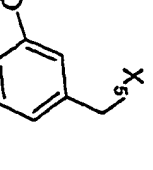
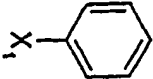
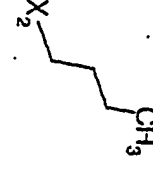
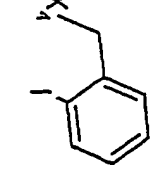
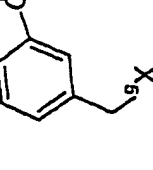
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672						1.95	513.2628	514.2707
673								
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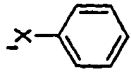
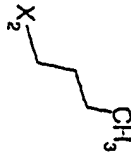
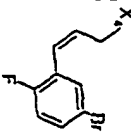
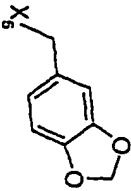
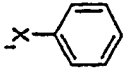
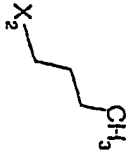
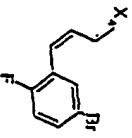
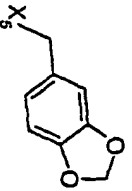
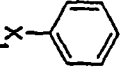
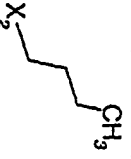
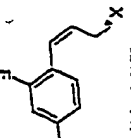
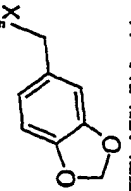
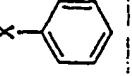
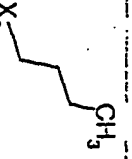
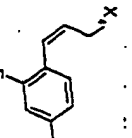
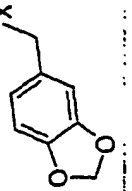
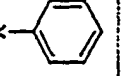
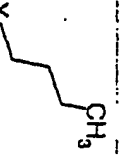
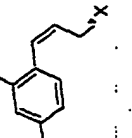
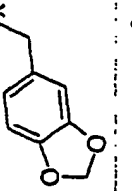


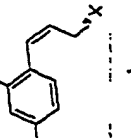
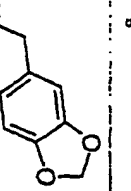
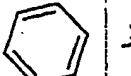
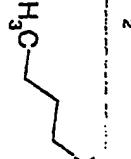
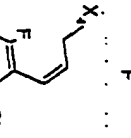
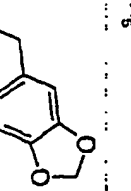
677								
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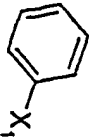

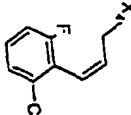
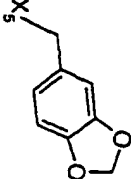
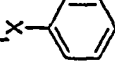

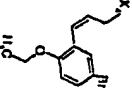
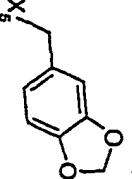
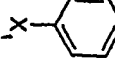
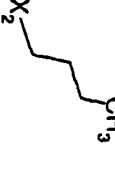

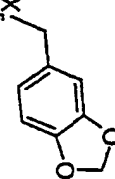
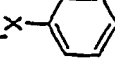

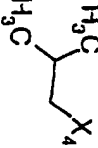
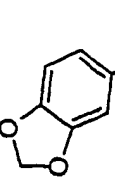
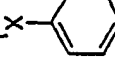

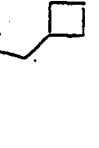
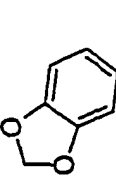
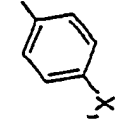


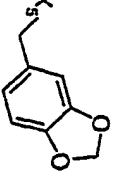
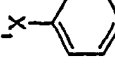


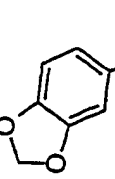
684						2.08	545,1678	546,202
685								
686								
687								
688						2.13	557,3042	558,3334



689								
690						2.07	535.1484	536.1722
691								
692						2.06	579.1383	580.1661
693								
694						2.07	535.1484	536.1789

695								
696						2.05	579.1383	580.1685
697								
698						2.04	579.1383	580.1639
699								

700								
701								
702								
703								
704						2.08	531.2089	532.2461
705								
706						2.07	531.2089	532.2447

707								
708						2.12	601.194	602.24
709								
710						1.84	437.2479	438.2715
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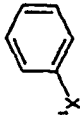

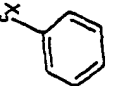
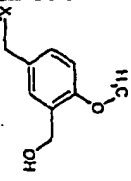
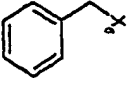
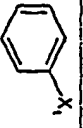

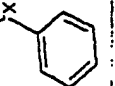
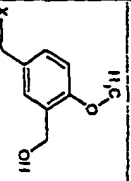
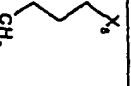
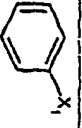

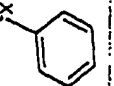
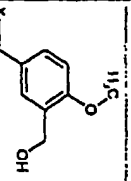
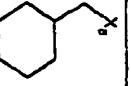
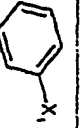

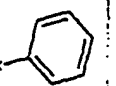
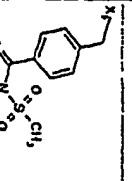
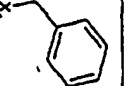
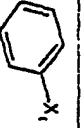

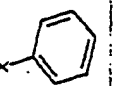
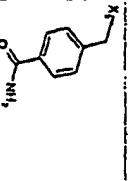
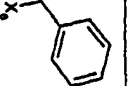
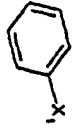

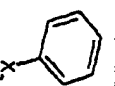
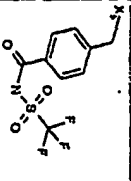

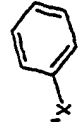
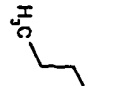
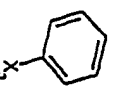
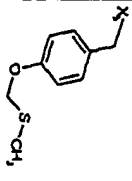
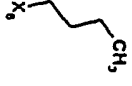
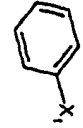

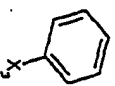
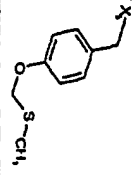
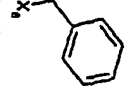
714						1.91	451.2635	452.2922
715						2.02	451.2635	452.2937
716						2	463.2635	464.2918
717						1.98	465.2791	466.3056
718						1.97	465.2791	466.3057
719						1.94	465.2791	466.3067

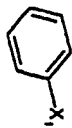
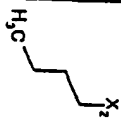
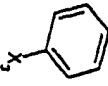
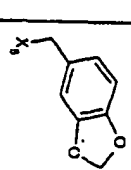
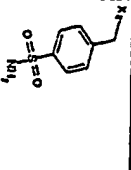
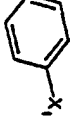
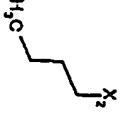
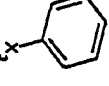
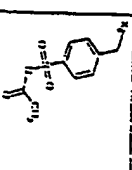


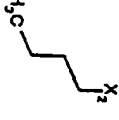
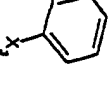
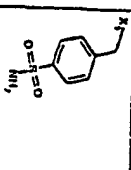
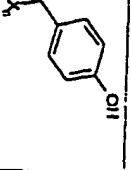
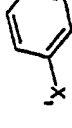

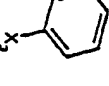
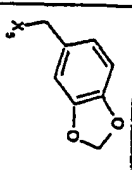
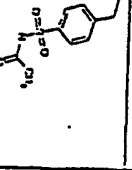

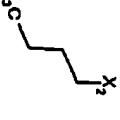
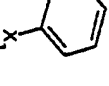
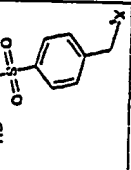
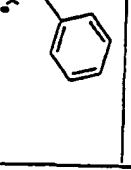


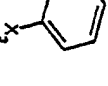
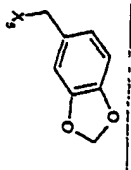
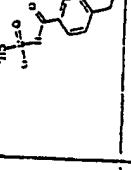


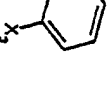
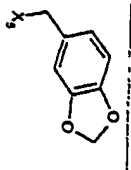
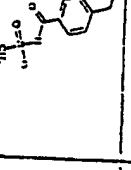
720						2.05	465.2791	466.31
721						2.06	465.2791	466.309
722						1.99	477.2791	478.3101
723						2.08	477.2791	478.3092
724						2.03	479.2948	480.3289
725						2.03	491.2948	492.327
726						2.1	491.2948	492.3293

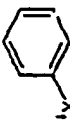
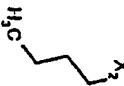
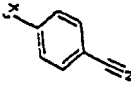
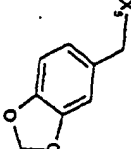

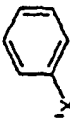
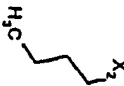
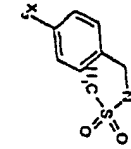
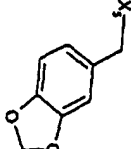

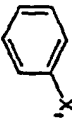

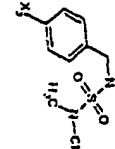
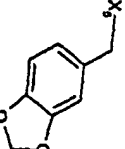

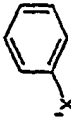

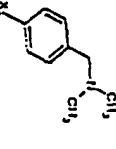
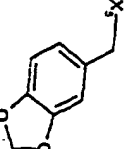

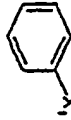
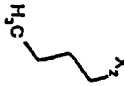
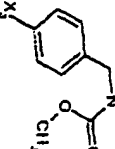
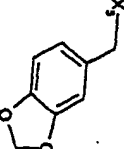

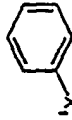
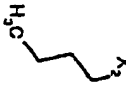
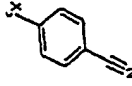
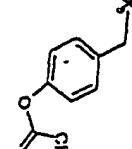

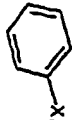

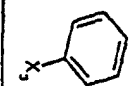
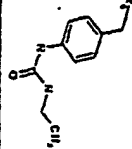
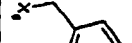
1041							1.74	497.3042	498.3471
1042							1.99	537.3355	538.3746
1043							1.91	572.2787	573.3109
1044							1.88	494.3046	495.3434
1045							1.91	572.2821	573.3249
1046									
1047									
1048							2.04	595.2777	596.3219

1049							1.85	588.3231	589.3849
1050							1.72	554.3621	555.4208
1051							2	547.301	548.3278
1052							1.78	582.357	583.4136
1053							1.99	573.2991	574.3322
1054							1.95	539.3148	540.3422
1055							2.1	579.3461	580.3743



1056							1.97	645.3042	546.3319
1057							1.81	511.3199	512.3505
1058							2.04	551.3512	552.3825
1059							1.93	606.2665	607.3164
1060							1.91	528.2889	529.3276
1061									
1062							1.98	527.2971	528.3281
1063							2.09	561.2814	562.3166

1064							1.87	608.2457	609.2976
1065							1.8	572.2821	573.3208
1066							1.79	560.2508	561.3011
1067							1.9	650.2563	651.3043
1068							1.92	608.2665	607.2303
1069							1.9	650.2563	651.2313
1070							1.9	650.2563	651.2313

1071							1.96	520.2838	521.3221
1072							1.88	602.2927	603.3342
1073							1.93	631.3192	632.3643
1074							1.78	552.3464	553.3979
1075							1.9	582.3208	583.3616
1076							1.95	534.2995	535.3354
1077							1.99	571.3311	572.3079

1078							1.75	574.2978	575.2848
1079							1.97	014.329	016.3132
1080							1.97	587.2764	588.2736
1081							1.78	600.2457	600.2491
1082							2.03	531.2653	532.2452
1083							1.97	525.2991	526.2742
1084							1.98	525.2991	526.2038
1085							1.82	588.3134	589.3152

1086							1.93	511,319	512,295
1087							2.06	555,2498	556,2386
1088							2.07	559,2635	560,2629
1089							1.99	559,2835	560,2698
1090							2.02	628,3447	629,3398
1091							2	603,2348	594,2117
1092							1.95	559,2035	560,2043
1093							2.02	593,2445	594,2274

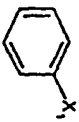
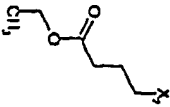
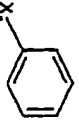
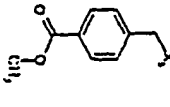
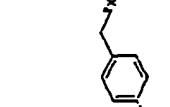
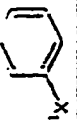
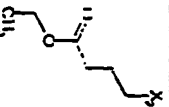

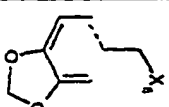
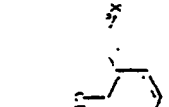
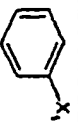
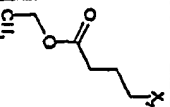
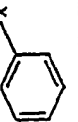
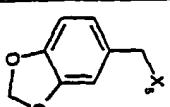
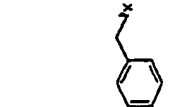
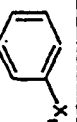
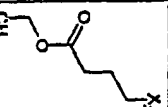
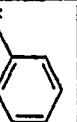
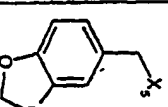
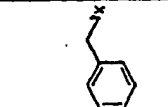
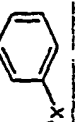
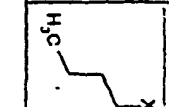
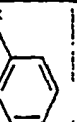
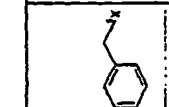
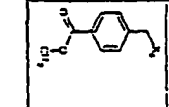
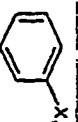
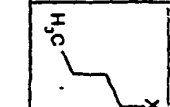
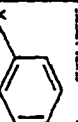
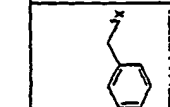
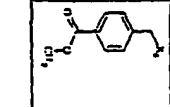
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1095							1.71	607.2617	608.2644
1096							2.11	629.3254	630.3112
1097							2.11	595.341	596.3187
1098							1.89	545.2678	546.2605
1099							1.96	579.2289	580.2228
1100							1.97	559.2835	560.2682
1101							1.94	573.2628	574.2623

1102							1.83	558,3029	559,2951
1103							1.87	531,2886	532,2817
1104							1.93	565,2496	566,246
1105							1.95	545,3042	546,2853
1106							1.89	545,3042	546,2855
1107							1.98	551,3512	552,3348
1108							1.83	584,2301	595,2273
1109							2.01	531,2853	532,2531

1110							1.8	407.3042	400.2037
1111							1.96	625.2991	626.2787
1112							2.04	665.2486	666.2412
1113							2.06	669.2835	660.2628
1114							1.89	604.2665	605.256
1115							1.97	626.2991	626.292
1116							1.87	660.2821	661.2739



1117							1.88	560.2821	561.2766
1118							1.88	560.2821	561.2753
1119							1.89	524.3151	525.3075
1120							2	646.2839	646.274
1121							1.89	651.25	652.2567
1122							2.01	631.3046	632.2967

1123							1.89	644.3362	645.35
1124							2.01	631.2002	632.2625
1125							2	637.2344	638.2382
1126							2.01	617.289	618.2725
1127							1.9	630.3206	631.3359
1128							2.07	627.2709	628.2573

1129						2.02	573.2991	574.2791
1130						1.92	586.3307	587.3427
1131								
1132						1.87	561.2991	562.3006
1133								
1134								
1135								

1136									
1137									
1138									
1139									
1140									
1141									
1142									

1143							202	613.2552	614.2456
1144							1.98	559.2835	560.2794
1145							1.88	572.3161	573.3293
1146							1.98	603.2733	604.278
1147							2.05	575.3148	576.3073
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1149							2.01	631.3046	632.2966
1150							1.91	500.3202	509.323

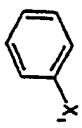

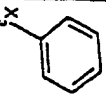
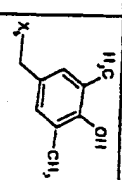
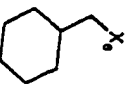
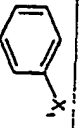
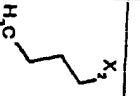
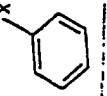
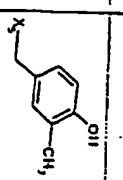
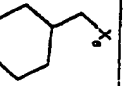
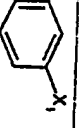

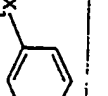
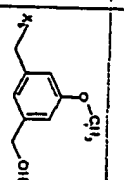

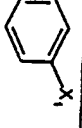
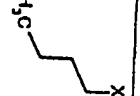
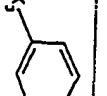
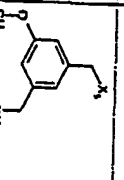
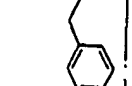
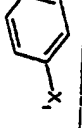

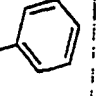
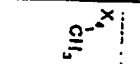
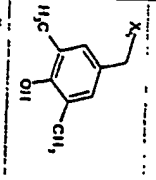



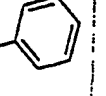
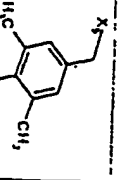
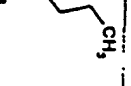
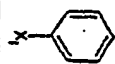
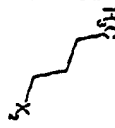
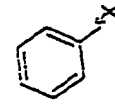
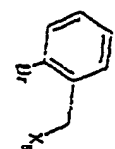
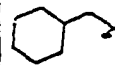
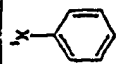

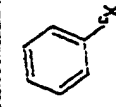
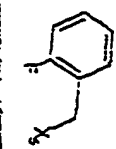
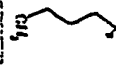
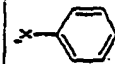
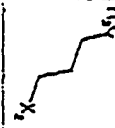
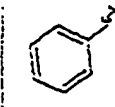
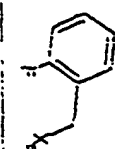
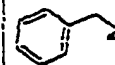
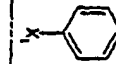
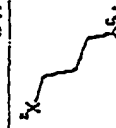
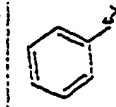
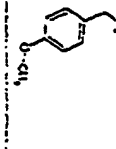
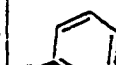
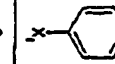

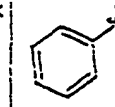
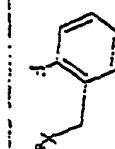
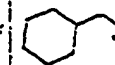
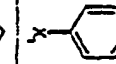

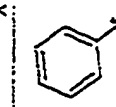
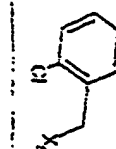
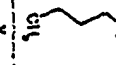
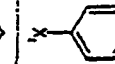

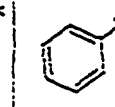
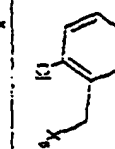
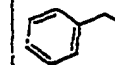
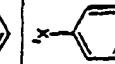
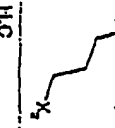
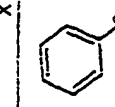
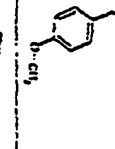
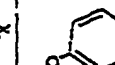
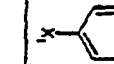

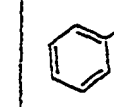
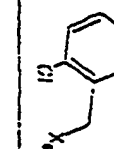
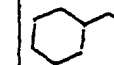
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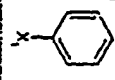
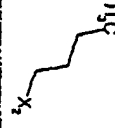
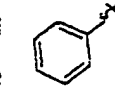
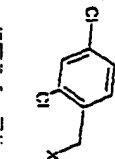
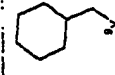
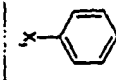
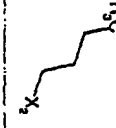
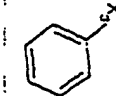
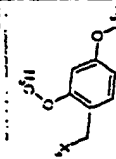
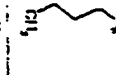
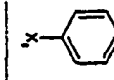
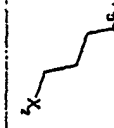
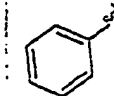
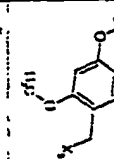
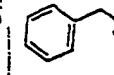
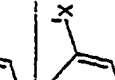

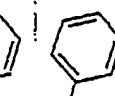
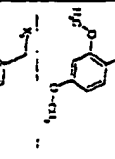

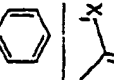

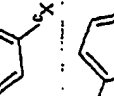
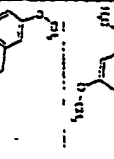
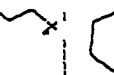
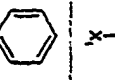
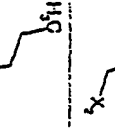
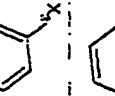
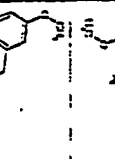
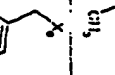
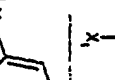

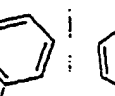
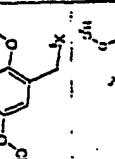
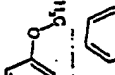
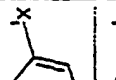

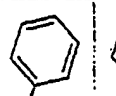
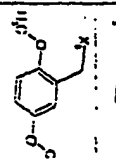
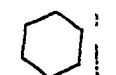
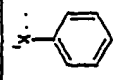

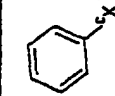
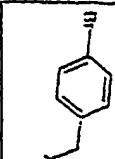
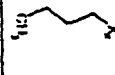





TABLE 2A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Comp. #	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup> is H unless otherwise specified	R <sup>5</sup>	R <sup>6</sup>	R <sup>7</sup> is H unless otherwise specified	R <sup>8</sup>	R <sup>9</sup>	R <sup>10</sup>	R <sup>11</sup>	R <sup>12</sup>	R <sup>13</sup>	R <sup>14</sup>	R <sup>15</sup>	R <sup>16</sup>	R <sup>17</sup>	R <sup>18</sup>	R <sup>19</sup>	R <sup>20</sup>	R <sup>21</sup>	R <sup>22</sup>	R <sup>23</sup>	R <sup>24</sup>	R <sup>25</sup>	R <sup>26</sup>	R <sup>27</sup>	R <sup>28</sup>	R <sup>29</sup>	R <sup>30</sup>	R <sup>31</sup>	R <sup>32</sup>	R <sup>33</sup>	R <sup>34</sup>	R <sup>35</sup>	R <sup>36</sup>	R <sup>37</sup>	R <sup>38</sup>	R <sup>39</sup>	R <sup>40</sup>	R <sup>41</sup>	R <sup>42</sup>	R <sup>43</sup>	R <sup>44</sup>	R <sup>45</sup>	R <sup>46</sup>	R <sup>47</sup>	R <sup>48</sup>	R <sup>49</sup>	R <sup>50</sup>	R <sup>51</sup>	R <sup>52</sup>	R <sup>53</sup>	R <sup>54</sup>	R <sup>55</sup>	R <sup>56</sup>	R <sup>57</sup>	R <sup>58</sup>	R <sup>59</sup>	R <sup>60</sup>	R <sup>61</sup>	R <sup>62</sup>	R <sup>63</sup>	R <sup>64</sup>	R <sup>65</sup>	R <sup>66</sup>	R <sup>67</sup>	R <sup>68</sup>	R <sup>69</sup>	R <sup>70</sup>	R <sup>71</sup>	R <sup>72</sup>	R <sup>73</sup>	R <sup>74</sup>	R <sup>75</sup>	R <sup>76</sup>	R <sup>77</sup>	R <sup>78</sup>	R <sup>79</sup>	R <sup>80</sup>	R <sup>81</sup>	R <sup>82</sup>	R <sup>83</sup>	R <sup>84</sup>	R <sup>85</sup>	R <sup>86</sup>	R <sup>87</sup>	R <sup>88</sup>	R <sup>89</sup>	R <sup>90</sup>	R <sup>91</sup>	R <sup>92</sup>	R <sup>93</sup>	R <sup>94</sup>	R <sup>95</sup>	R <sup>96</sup>	R <sup>97</sup>	R <sup>98</sup>	R <sup>99</sup>	R <sup>100</sup>	R <sup>101</sup>	R <sup>102</sup>	R <sup>103</sup>	R <sup>104</sup>	R <sup>105</sup>	R <sup>106</sup>	R <sup>107</sup>	R <sup>108</sup>	R <sup>109</sup>	R <sup>110</sup>	R <sup>111</sup>	R <sup>112</sup>	R <sup>113</sup>	R <sup>114</sup>	R <sup>115</sup>	R <sup>116</sup>	R <sup>117</sup>	R <sup>118</sup>	R <sup>119</sup>	R <sup>120</sup>	R <sup>121</sup>	R <sup>122</sup>	R <sup>123</sup>	R <sup>124</sup>	R <sup>125</sup>	R <sup>126</sup>	R <sup>127</sup>	R <sup>128</sup>	R <sup>129</sup>	R <sup>130</sup>	R <sup>131</sup>	R <sup>132</sup>	R <sup>133</sup>	R <sup>134</sup>	R <sup>135</sup>	R <sup>136</sup>	R <sup>137</sup>	R <sup>138</sup>	R <sup>139</sup>	R <sup>140</sup>	R <sup>141</sup>	R <sup>142</sup>	R <sup>143</sup>	R <sup>144</sup>	R <sup>145</sup>	R <sup>146</sup>	R <sup>147</sup>	R <sup>148</sup>	R <sup>149</sup>	R <sup>150</sup>	R <sup>151</sup>	R <sup>152</sup>	R <sup>153</sup>	R <sup>154</sup>	R <sup>155</sup>	R <sup>156</sup>	R <sup>157</sup>	R <sup>158</sup>	R <sup>159</sup>	R <sup>160</sup>	R <sup>161</sup>	R <sup>162</sup>	R <sup>163</sup>	R <sup>164</sup>	R <sup>165</sup>	R <sup>166</sup>	R <sup>167</sup>	R <sup>168</sup>	R <sup>169</sup>	R <sup>170</sup>	R <sup>171</sup>	R <sup>172</sup>	R <sup>173</sup>	R <sup>174</sup>	R <sup>175</sup>	R <sup>176</sup>	R <sup>177</sup>	R <sup>178</sup>	R <sup>179</sup>	R <sup>180</sup>	R <sup>181</sup>	R <sup>182</sup>	R <sup>183</sup>	R <sup>184</sup>	R <sup>185</sup>	R <sup>186</sup>	R <sup>187</sup>	R <sup>188</sup>	R <sup>189</sup>	R <sup>190</sup>	R <sup>191</sup>	R <sup>192</sup>	R <sup>193</sup>	R <sup>194</sup>	R <sup>195</sup>	R <sup>196</sup>	R <sup>197</sup>	R <sup>198</sup>	R <sup>199</sup>	R <sup>200</sup>	R <sup>201</sup>	R <sup>202</sup>	R <sup>203</sup>	R <sup>204</sup>	R <sup>205</sup>	R <sup>206</sup>	R <sup>207</sup>	R <sup>208</sup>	R <sup>209</sup>	R <sup>210</sup>	R <sup>211</sup>	R <sup>212</sup>	R <sup>213</sup>	R <sup>214</sup>	R <sup>215</sup>	R <sup>216</sup>	R <sup>217</sup>	R <sup>218</sup>	R <sup>219</sup>	R <sup>220</sup>	R <sup>221</sup>	R <sup>222</sup>	R <sup>223</sup>	R <sup>224</sup>	R <sup>225</sup>	R <sup>226</sup>	R <sup>227</sup>	R <sup>228</sup>	R <sup>229</sup>	R <sup>230</sup>	R <sup>231</sup>	R <sup>232</sup>	R <sup>233</sup>	R <sup>234</sup>	R <sup>235</sup>	R <sup>236</sup>	R <sup>237</sup>	R <sup>238</sup>	R <sup>239</sup>	R <sup>240</sup>	R <sup>241</sup>	R <sup>242</sup>	R <sup>243</sup>	R <sup>244</sup>	R <sup>245</sup>	R <sup>246</sup>	R <sup>247</sup>	R <sup>248</sup>	R <sup>249</sup>	R <sup>250</sup>	R <sup>251</sup>	R <sup>252</sup>	R <sup>253</sup>	R <sup>254</sup>	R <sup>255</sup>	R <sup>256</sup>	R <sup>257</sup>	R <sup>258</sup>	R <sup>259</sup>	R <sup>260</sup>	R <sup>261</sup>	R <sup>262</sup>	R <sup>263</sup>	R <sup>264</sup>	R <sup>265</sup>	R <sup>266</sup>	R <sup>267</sup>	R <sup>268</sup>	R <sup>269</sup>	R <sup>270</sup>	R <sup>271</sup>	R <sup>272</sup>	R <sup>273</sup>	R <sup>274</sup>	R <sup>275</sup>	R <sup>276</sup>	R <sup>277</sup>	R <sup>278</sup>	R <sup>279</sup>	R <sup>280</sup>	R <sup>281</sup>	R <sup>282</sup>	R <sup>283</sup>	R <sup>284</sup>	R <sup>285</sup>	R <sup>286</sup>	R <sup>287</sup>	R <sup>288</sup>	R <sup>289</sup>	R <sup>290</sup>	R <sup>291</sup>	R <sup>292</sup>	R <sup>293</sup>	R <sup>294</sup>	R <sup>295</sup>	R <sup>296</sup>	R <sup>297</sup>	R <sup>298</sup>	R <sup>299</sup>	R <sup>300</sup>	R <sup>301</sup>	R <sup>302</sup>	R <sup>303</sup>	R <sup>304</sup>	R <sup>305</sup>	R <sup>306</sup>	R <sup>307</sup>	R <sup>308</sup>	R <sup>309</sup>	R <sup>310</sup>	R <sup>311</sup>	R <sup>312</sup>	R <sup>313</sup>	R <sup>314</sup>	R <sup>315</sup>	R <sup>316</sup>	R <sup>317</sup>	R <sup>318</sup>	R <sup>319</sup>	R <sup>320</sup>	R <sup>321</sup>	R <sup>322</sup>	R <sup>323</sup>	R <sup>324</sup>	R <sup>325</sup>	R <sup>326</sup>	R <sup>327</sup>	R <sup>328</sup>	R <sup>329</sup>	R <sup>330</sup>	R <sup>331</sup>	R <sup>332</sup>	R <sup>333</sup>	R <sup>334</sup>	R <sup>335</sup>	R <sup>336</sup>	R <sup>337</sup>	R <sup>338</sup>	R <sup>339</sup>	R <sup>340</sup>	R <sup>341</sup>	R <sup>342</sup>	R <sup>343</sup>	R <sup>344</sup>	R <sup>345</sup>	R <sup>346</sup>	R <sup>347</sup>	R <sup>348</sup>	R <sup>349</sup>	R <sup>350</sup>	R <sup>351</sup>	R <sup>352</sup>	R <sup>353</sup>	R <sup>354</sup>	R <sup>355</sup>	R <sup>356</sup>	R <sup>357</sup>	R <sup>358</sup>	R <sup>359</sup>	R <sup>360</sup>	R <sup>361</sup>	R <sup>362</sup>	R <sup>363</sup>	R <sup>364</sup>	R <sup>365</sup>	R <sup>366</sup>	R <sup>367</sup>	R <sup>368</sup>	R <sup>369</sup>	R <sup>370</sup>	R <sup>371</sup>	R <sup>372</sup>	R <sup>373</sup>	R <sup>374</sup>	R <sup>375</sup>	R <sup>376</sup>	R <sup>377</sup>	R <sup>378</sup>	R <sup>379</sup>	R <sup>380</sup>	R <sup>381</sup>	R <sup>382</sup>	R <sup>383</sup>	R <sup>384</sup>	R <sup>385</sup>	R <sup>386</sup>	R <sup>387</sup>	R <sup>388</sup>	R <sup>389</sup>	R <sup>390</sup>	R <sup>391</sup>	R <sup>392</sup>	R <sup>393</sup>	R <sup>394</sup>	R <sup>395</sup>	R <sup>396</sup>	R <sup>397</sup>	R <sup>398</sup>	R <sup>399</sup>	R <sup>400</sup>	R <sup>401</sup>	R <sup>402</sup>	R <sup>403</sup>	R <sup>404</sup>	R <sup>405</sup>	R <sup>406</sup>	R <sup>407</sup>	R <sup>408</sup>	R <sup>409</sup>	R <sup>410</sup>	R <sup>411</sup>	R <sup>412</sup>	R <sup>413</sup>	R <sup>414</sup>	R <sup>415</sup>	R <sup>416</sup>	R <sup>417</sup>	R <sup>418</sup>	R <sup>419</sup>	R <sup>420</sup>	R <sup>421</sup>	R <sup>422</sup>	R <sup>423</sup>	R <sup>424</sup>	R <sup>425</sup>	R <sup>426</sup>	R <sup>427</sup>	R <sup>428</sup>	R <sup>429</sup>	R <sup>430</sup>	R <sup>431</sup>	R <sup>432</sup>	R <sup>433</sup>	R <sup>434</sup>	R <sup>435</sup>	R <sup>436</sup>	R <sup>437</sup>	R <sup>438</sup>	R <sup>439</sup>	R <sup>440</sup>	R <sup>441</sup>	R <sup>442</sup>	R <sup>443</sup>	R <sup>444</sup>	R <sup>445</sup>	R <sup>446</sup>	R <sup>447</sup>	R <sup>448</sup>	R <sup>449</sup>	R <sup>450</sup>	R <sup>451</sup>	R <sup>452</sup>	R <sup>453</sup>	R <sup>454</sup>	R <sup>455</sup>	R <sup>456</sup>	R <sup>457</sup>	R <sup>458</sup>	R <sup>459</sup>	R <sup>460</sup>	R <sup>461</sup>	R <sup>462</sup>	R <sup>463</sup>	R <sup>464</sup>	R <sup>465</sup>	R <sup>466</sup>	R <sup>467</sup>	R <sup>468</sup>	R <sup>469</sup>	R <sup>470</sup>	R <sup>471</sup>	R <sup>472</sup>	R <sup>473</sup>	R <sup>474</sup>	R <sup>475</sup>	R <sup>476</sup>	R <sup>477</sup>	R <sup>478</sup>	R <sup>479</sup>	R <sup>480</sup>	R <sup>481</sup>	R <sup>482</sup>	R <sup>483</sup>	R <sup>484</sup>	R <sup>485</sup>	R <sup>486</sup>	R <sup>487</sup>	R <sup>488</sup>	R <sup>489</sup>	R <sup>490</sup>	R <sup>491</sup>	R <sup>492</sup>	R <sup>493</sup>	R <sup>494</sup>	R <sup>495</sup>	R <sup>496</sup>	R <sup>497</sup>	R <sup>498</sup>	R <sup>499</sup>	R <sup>500</sup>	R <sup>501</sup>	R <sup>502</sup>	R <sup>503</sup>	R <sup>504</sup>	R <sup>505</sup>	R <sup>506</sup>	R <sup>507</sup>	R <sup>508</sup>	R <sup>509</sup>	R <sup>510</sup>	R <sup>511</sup>	R <sup>512</sup>	R <sup>513</sup>	R <sup>514</sup>	R <sup>515</sup>	R <sup>516</sup>	R <sup>517</sup>	R <sup>518</sup>	R <sup>519</sup>	R <sup>520</sup>	R <sup>521</sup>	R <sup>522</sup>	R <sup>523</sup>	R <sup>524</sup>	R <sup>525</sup>	R <sup>526</sup>	R <sup>527</sup>	R <sup>528</sup>	R <sup>529</sup>	R <sup>530</sup>	R <sup>531</sup>	R <sup>532</sup>	R <sup>533</sup>	R <sup>534</sup>	R <sup>535</sup>	R <sup>536</sup>	R <sup>537</sup>	R <sup>538</sup>	R <sup>539</sup>	R <sup>540</sup>	R <sup>541</sup>	R <sup>542</sup>	R <sup>543</sup>	R <sup>544</sup>	R <sup>545</sup>	R <sup>546</sup>	R <sup>547</sup>	R <sup>548</sup>	R <sup>549</sup>	R <sup>550</sup>	R <sup>551</sup>	R <sup>552</sup>	R <sup>553</sup>	R <sup>554</sup>	R <sup>555</sup>	R <sup>556</sup>	R <sup>557</sup>	R <sup>558</sup>	R <sup>559</sup>	R <sup>560</sup>	R <sup>561</sup>	R <sup>562</sup>	R <sup>563</sup>	R <sup>564</sup>	R <sup>565</sup>	R <sup>566</sup>	R <sup>567</sup>	R <sup>568</sup>	R <sup>569</sup>	R <sup>570</sup>	R <sup>571</sup>	R <sup>572</sup>	R <sup>573</sup>	R <sup>574</sup>	R <sup>575</sup>	R <sup>576</sup>	R <sup>577</sup>	R <sup>578</sup>	R <sup>579</sup>	R <sup>580</sup>	R <sup>581</sup>	R <sup>582</sup>	R <sup>583</sup>	R <sup>584</sup>	R <sup>585</sup>	R <sup>586</sup>	R <sup>587</sup>	R <sup>588</sup>	R <sup>589</sup>	R <sup>590</sup>	R <sup>591</sup>	R <sup>592</sup>	R <sup>593</sup>	R <sup>594</sup>	R <sup>595</sup>	R <sup>596</sup>	R <sup>597</sup>	R <sup>598</sup>	R <sup>599</sup>	R <sup>600</sup>	R <sup>601</sup>	R <sup>602</sup>	R <sup>603</sup>	R <sup>604</sup>	R <sup>605</sup>	R <sup>606</sup>	R <sup>607</sup>	R <sup>608</sup>	R <sup>609</sup>	R <sup>610</sup>	R <sup>611</sup>	R <sup>612</sup>	R <sup>613</sup>	R <sup>614</sup>	R <sup>615</sup>	R <sup>616</sup>	R <sup>617</sup>	R <sup>618</sup>	R <sup>619</sup>	R <sup>620</sup>	R <sup>621</sup>	R <sup>622</sup>	R <sup>623</sup>	R <sup>624</sup>	R <sup>625</sup>	R <sup>626</sup>	R <sup>627</sup>	R <sup>628</sup>	R <sup>629</sup>	R <sup>630</sup>	R <sup>631</sup>	R <sup>632</sup>	R <sup>633</sup>	R <sup>634</sup>	R <sup>635</sup>	R <sup>636</sup>	R <sup>637</sup>	R <sup>638</sup>	R <sup>639</sup>	R <sup>640</sup>	R <sup>641</sup>	R <sup>642</sup>	R <sup>643</sup>	R <sup>644</sup>	R <sup>645</sup>	R <sup>646</sup>	R <sup>647</sup>	R <sup>648</sup>	R <sup>649</sup>	R <sup>650</sup>	R <sup>651</sup>	R <sup>652</sup>	R <sup>653</sup>	R <sup>654</sup>	R <sup>655</sup>	R <sup>656</sup>	R <sup>657</sup>	R <sup>658</sup>	R <sup>659</sup>	R <sup>660</sup>	R <sup>661</sup>	R <sup>662</sup>	R <sup>663</sup>	R <sup>664</sup>	R <sup>665</sup>	R <sup>666</sup>	R <sup>667</sup>	R <sup>668</sup>	R <sup>669</sup>	R <sup>670</sup>	R <sup>671</sup>	R <sup>672</sup>	R <sup>673</sup>	R <sup>674</sup>	R <sup>675</sup>	R <sup>676</sup>	R <sup>677</sup>	R <sup>678</sup>	R <sup>679</sup>	R <sup>680</sup>	R <sup>681</sup>	R <sup>682</sup>	R <sup>683</sup>	R <sup>684</sup>	R <sup>685</sup>	R <sup>686</sup>	R <sup>687</sup>	R <sup>688</sup>	R <sup>689</sup>	R <sup>690</sup>	R <sup>691</sup>	R <sup>692</sup>	R <sup>693</sup>	R <sup>694</sup>	R <sup>695</sup>	R <sup>696</sup>	R <sup>697</sup>	R <sup>698</sup>	R <sup>699</sup>	R <sup>700</sup>	R <sup>701</sup>	R <sup>702</sup>	R <sup>703</sup>	R <sup>704</sup>	R <sup>705</sup>	R <sup>706</sup>	R <sup>707</sup>	R <sup>708</sup>	R <sup>709</sup>	R <sup>710</sup>	R <sup>711</sup>	R <sup>712</sup>	R <sup>713</sup>	R <sup>714</sup>	R <sup>715</sup>	R <sup>716</sup>	R <sup>717</sup>	R <sup>718</sup>	R <sup>719</sup>	R <sup>720</sup>	R <sup>721</sup>	R <sup>722</sup>	R <sup>723</sup>	R <sup>724</sup>	R <sup>725</sup>	R <sup>726</sup>	R <sup>727</sup>	R <sup>728</sup>	R <sup>729</sup>	R <sup>730</sup>	R <sup>731</sup>	R <sup>732</sup>	R <sup>733</sup>	R <sup>734</sup>	R <sup>735</sup>	R <sup>736</sup>	R <sup>737</sup>	R <sup>738</sup>	R <sup>739</sup>	R <sup>740</sup>	R <sup>741</sup>	R <sup>742</sup>	R <sup>743</sup>	R <sup>744</sup>	R <sup>745</sup>	R <sup>746</sup>	R <sup>747</sup>	R <sup>748</sup>	R <sup>749</sup>	R <sup>750</sup>	R <sup>751</sup>	R <sup>752</sup>	R <sup>753</sup>	R <sup>754</sup>	R <sup>755</sup>	R <sup>756</sup>	R <sup>757</sup>	R <sup>758</sup>	R <sup>759</sup>	R <sup>760</sup>	R <sup>761</sup>	R <sup>762</sup>	R <sup>763</sup>	R <sup>764</sup>	R <sup>765</sup>	R <sup>766</sup>	R <sup>767</sup>	R <sup>768</sup>	R <sup>769</sup>	R <sup>770</sup>	R <sup>771</sup>	R <sup>772</sup>	R <sup>773</sup>	R <sup>774</sup>	R <sup>775</sup>	R <sup>776</sup>	R <sup>777</sup>	R <sup>778</sup>	R <sup>779</sup>	R <sup>780</sup>	R <sup>781</sup>	R <sup>782</sup>	R <sup>783</sup>	R <sup>784</sup>	R <sup>785</sup>	R <sup>786</sup>	R <sup>787</sup>	R <sup>788</sup>	R <sup>789</sup>	R <sup>790</sup>	R <sup>791</sup>	R <sup>792</sup>	R <sup>793</sup>	R <sup>794</sup>	R <sup>795</sup>	R <sup>796</sup>	R <sup>797</sup>	R <sup>798</sup>	R <sup>799</sup>	R <sup>800</sup>	R <sup>801</sup>	R <sup>802</sup>	R <sup>803</sup>	R <sup>804</sup>	R <sup>805</sup>	R <sup>806</sup>	R <sup>807</sup>	R <sup>808</sup>	R <sup>809</sup>	R <sup>810</sup>	R <sup>811</sup>	R <sup>812</sup>	R <sup>813</sup>	R <sup>814</sup>	R <sup>815</sup>	R <sup>816</sup>	R <sup>817</sup>	R <sup>818</sup>	R <sup>819</sup>	R <sup>820</sup>	R <sup>821</sup>	R <sup>822</sup>	R <sup>823</sup>	R <sup>824</sup>	R <sup>825</sup>	R <sup>826</sup>	R <sup>827</sup>	R <sup>828</sup>	R <sup>829</sup>	R <sup>830</sup>	R <sup>831</sup>	R <sup>832</sup>	R <sup>833</sup>	R <sup>834</sup>	R <sup>835</sup>	R <sup>836</sup>	R <sup>837</sup>	R <sup>838</sup>	R <sup>839</sup>	R <sup>840</sup>	R <sup>841</sup>	R <sup>842</sup>	R <sup>843</sup>	R <sup>844</sup>	R <sup>845</sup>	R <sup>846</sup>	R <sup>847</sup>	R <sup>848</sup>	R <sup>849</sup>	R <sup>850</sup>	R <sup>851</sup>	R <sup>852</sup>	R <sup>853</sup>	R <sup>854</sup>	R <sup>855</sup>	R <sup>856</sup>	R <sup>857</sup>	R <sup>858</sup>	R <sup>859</sup>	R <sup>860</sup>	R <sup>861</sup>	R <sup>862</sup>	R <sup>863</sup>	R <sup>864</sup>	R <sup>865</sup>	R <sup>866</sup>	R <sup>867</sup>	R <sup>868</sup>	R <sup>869</sup>	R <sup>870</sup>	R <sup>871</sup>	R <sup>872</sup>	R <sup>873</sup>	R <sup>874</sup>	R <sup>875</sup>	R <sup>876</sup>	R <sup>877</sup>	R <sup>878</sup>	R <sup>879</sup>	R <sup>880</sup>	R <sup>881</sup>	R <sup>882</sup>	R <sup>883</sup>	R <sup>884</sup>	R <sup>885</sup>	R <sup>886</sup>	R <sup>887</sup>	R <sup>888</sup>	R <sup>889</sup>	R <sup>890</sup>	R <sup>891</sup>	R <sup>892</sup>	R <sup>893</sup>	R <sup>894</sup>	R <sup>895</sup>	R <sup>896</sup>	R <sup>897</sup>	R <sup>898</sup>	R <sup>899</sup>	R <sup>900</sup>	R <sup>901</sup>	R <sup>902</sup>	R <sup>903</sup>	R <sup>904</sup>	R <sup>905</sup>	R <sup>906</sup>	R <sup>907</sup>	R <sup>908</sup>	R <sup>909</sup>	R <sup>910</sup>	R <sup>911</sup>	R <sup>912</sup>	R <sup>913</sup>	R <sup>914</sup>	R <sup>915</sup>	R <sup>916</sup>	R <sup>917</sup>	R <sup>918</sup>	R <sup>919</sup>	R <sup>920</sup>	R <sup>921</sup>	R <sup>922</sup>	R <sup>923</sup>	R <sup>924</sup>	R <sup>925</sup>	R <sup>926</sup>	R <sup>927</sup>	R <sup>928</sup>	R <sup>929</sup>	R <sup>930</sup>	R <sup>931</sup>	R <sup>932</sup>	R <sup>933</sup>	R <sup>934</sup>	R <sup>935</sup>	R <sup>936</sup>	R <sup>937</sup>	R <sup>938</sup>	R <sup>939</sup>	R <sup>940</sup>	R <sup>941</sup>	R <sup>942</sup>	R <sup>943</sup>	R <sup>944</sup>	R <sup>945</sup>	R <sup>94</sup>

1164									
1165							2.05	469.2893	470.1875
1166							2.06	503.2727	504.3771
1167							2.05	533.2872	534.3865
1168							2.15	549.3204	550.4257
1169							2.10	593.2598	594.3613
1170							2.04	579.2441	580.3588
1171							2.10	549.2917	550.3768
1172							2.18	522.2411	523.3403

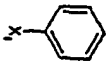

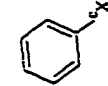
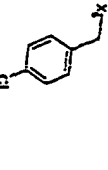
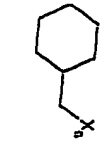
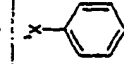

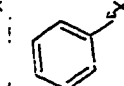
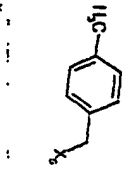
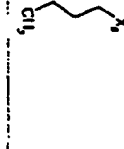
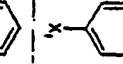

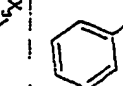
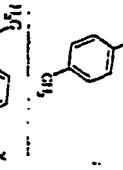
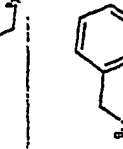
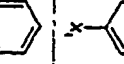

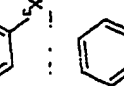
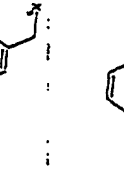
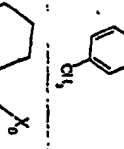
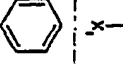

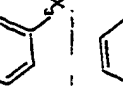
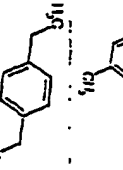
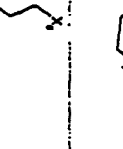

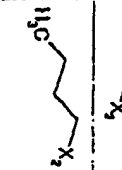
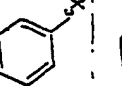
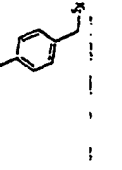
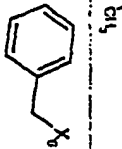
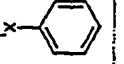

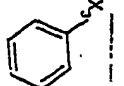
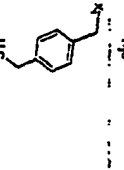
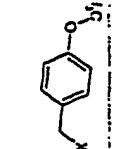
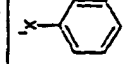
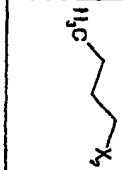
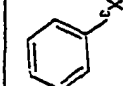
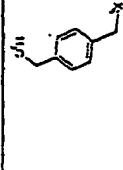
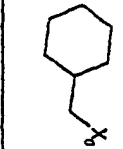







1173							2.06	465.3144	466.4148
1174							2.10	499.2107	500.4012
1176							2.10	529.1093	530.4119
1176									
1177							1.00	401.3003	402.4177
1178							2.07	616.2030	610.4023
1179							2.05	645.3042	640.4262
1180							2.12	621.3406	622.4584
1181							2.11	610.2001	620.4012

1102							2.09	553.2705	554.3001
1103							2.1	503.2011	504.4040
1104							2.17	559.3174	560.4424
1105							1.95	485.325	486.4390
1106							2.11	529.3003	530.4105
1107							2.09	559.3199	560.4452
1108									
1109							2.15	519.2208	520.3397
1190							2.15	553.2051	554.3204




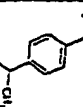
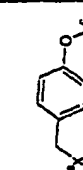

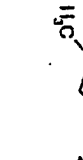

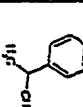
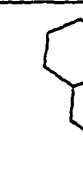






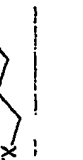

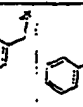
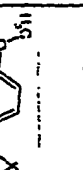



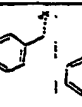
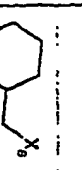



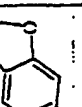




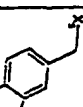
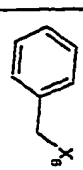

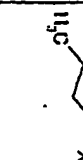

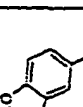
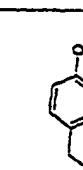





1191							2.26	559.2521	560.3600
1192							1.05	511.3199	512.4327
1193							2.05	545.3042	546.4219
1194							2.04	575.3148	576.4352
1195							2.09	551.3512	552.4750
1196							1.01	511.3109	512.4201
1197							2.05	545.3042	546.4178
1198							2.05	575.3140	576.4329
1199							2.12	551.3512	552.4604
1200							2.09	529.2003	530.33

1201						2.11	563.1830	564.32
1202						2.11	583.2042	584.34
1203								
1204						2	469.2093	470.3277
1205						2.05	503.2737	504.3101
1206						2.14	509.3206	510.3607
1207						2.06	485.2580	486.3074
1208						2.1	519.2441	520.2955
1209						2.09	648.2547	650.3127




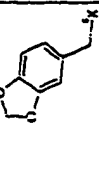
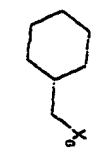



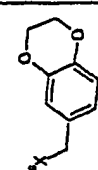




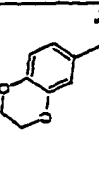
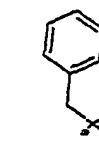



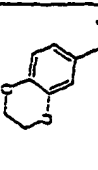
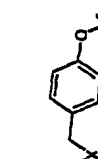



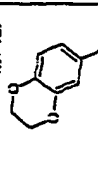
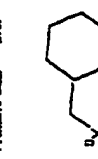



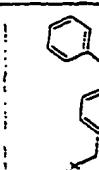




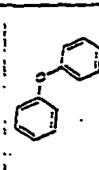
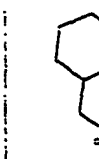
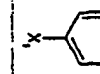

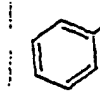
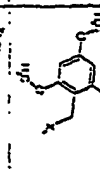
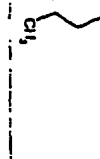



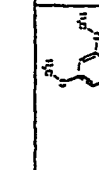
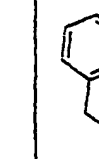
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1211							1.99	465.3144	466.3505
1212							2.1	499.2907	500.3643
1213									
1214							2.19	505.3457	506.4082
1215							2.04	479.33	480.3875
1216							2.13	513.3144	514.3647
1217							2.13	543.325	544.3029
1218							2.22	519.3613	520.4305

1219							1.91	401.3093	402.3635
1220							2.08	515.2036	516.3660
1221							2.05	545.3042	546.3688
1222							2.13	521.3405	522.4055
1223							1.97	495.325	496.3870
1224							2.09	520.3093	530.3716
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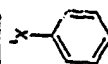

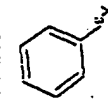
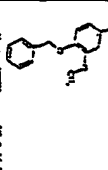
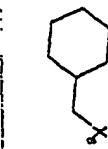
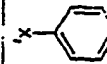

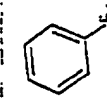
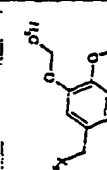
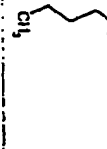
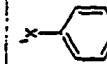

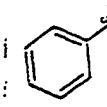
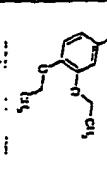
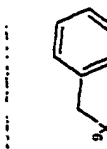
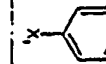
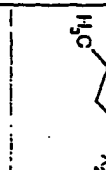
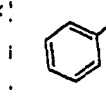
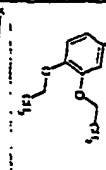
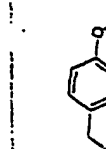
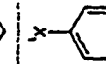

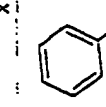
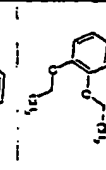
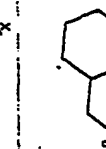
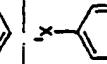

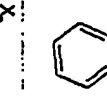
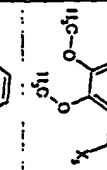
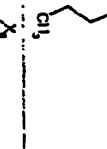
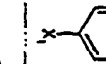

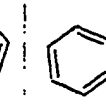
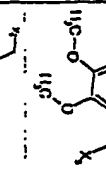
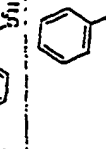


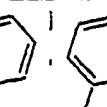
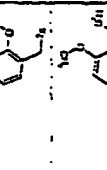
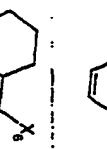



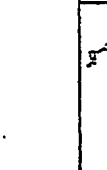
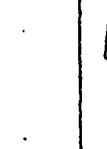
1228						2.17	557.3406	558.4227
1229						2.16	567.3512	568.4426
1230						2.26	563.3876	564.4908
1231						2.08	519.2091	520.3691
1232						2.08	553.2705	554.355
1233						2.09	563.2811	564.3691
1234						2.17	559.3174	560.4126
1235						2.07	493.3457	494.4268
1236						2.17	527.3301	528.4103

1237							2.15	557.3406	556.4276
1238									
1239							2.11	527.3301	520.4191
1240							2.10	501.3144	502.409
1241							2.15	591.325	592.4272
1242							2.20	567.3013	568.403
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1244							2.05	529.2729	530.3501
1245							2.04	559.2035	560.3697



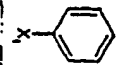
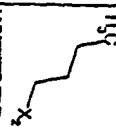
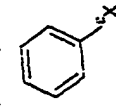
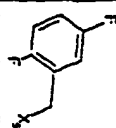
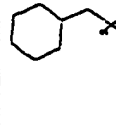
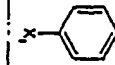
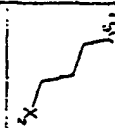
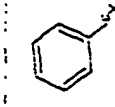
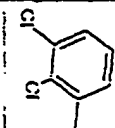
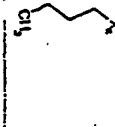
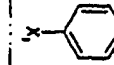
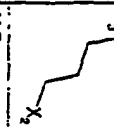
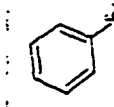
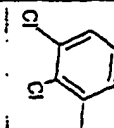
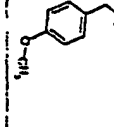
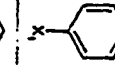
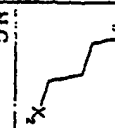
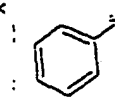
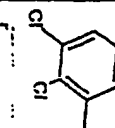
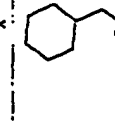
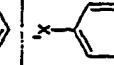

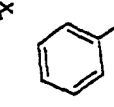
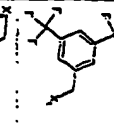
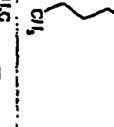
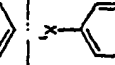
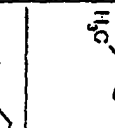
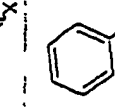
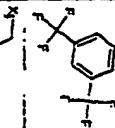
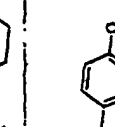
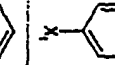
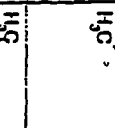
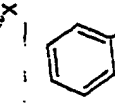
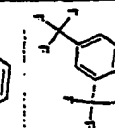
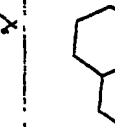
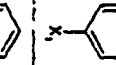

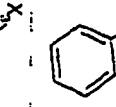
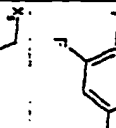
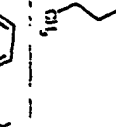
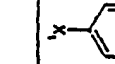
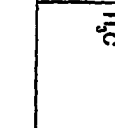
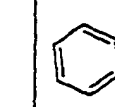
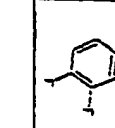
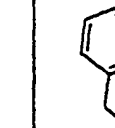
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1247							1.94	509.3042	510.3796
1248							2.05	543.2806	544.3738
1249							2.04	573.2991	574.3901
1250							2.13	549.3355	550.4245
1251							2.1	543.325	544.4101
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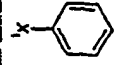

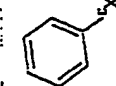
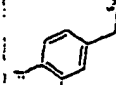
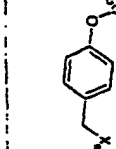
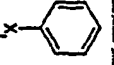

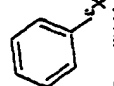
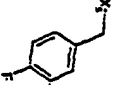
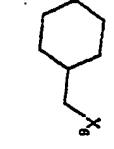
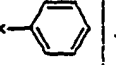
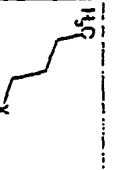
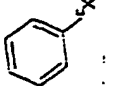
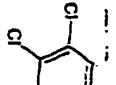
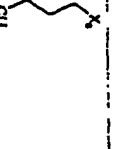


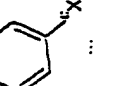
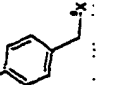
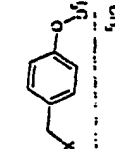
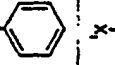

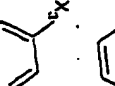
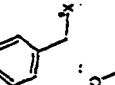
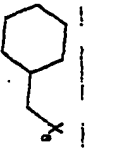
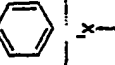

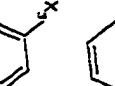
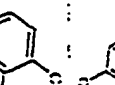
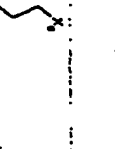
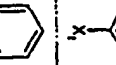
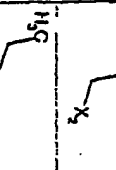
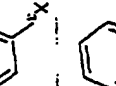
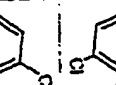
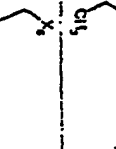
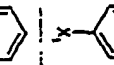
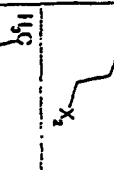
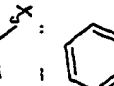
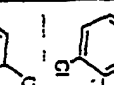
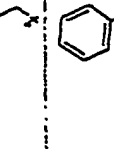
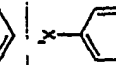

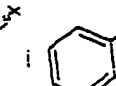
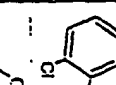
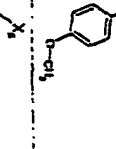
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1259							2.15	621.3355	622.450
1260							2.24	597.3719	598.4802
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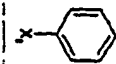
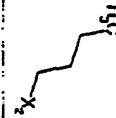
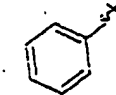
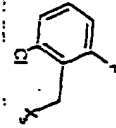
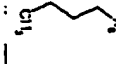
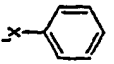

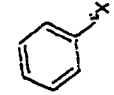
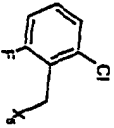
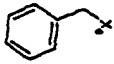
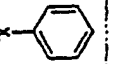
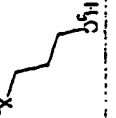
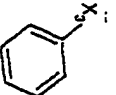
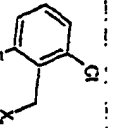
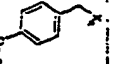

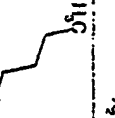
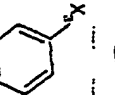
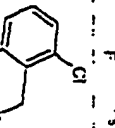
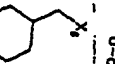
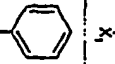
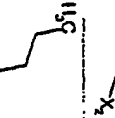
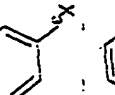
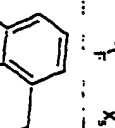
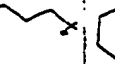
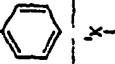

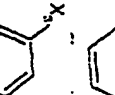
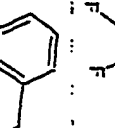
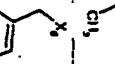
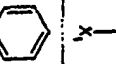
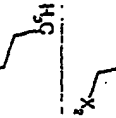
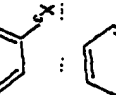
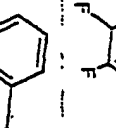

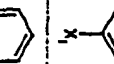
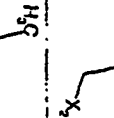
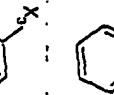
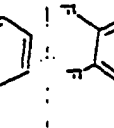
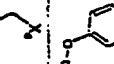
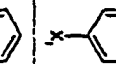
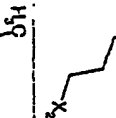
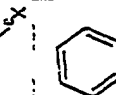
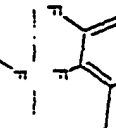
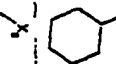
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1265									
1266									
1267									
1268									
1269							1.91	611.3109	612.4000
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1271							2.09	575.3148	570.4091
1272							2.12	661.3512	652.4404

1273							1.05	511.3109	512.394
1274							1.99	545.3042	546.3702
1275							1.97	575.3148	576.4008
1276							2.07	551.3512	552.4222
1277							2.02	560.2707	561.3565
1278							2	520.2944	527.3689
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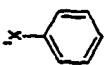
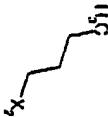
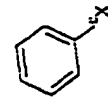
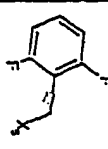
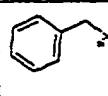


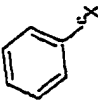
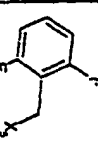



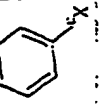
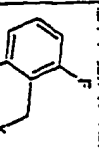



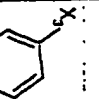
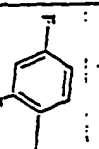


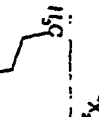
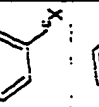
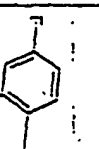


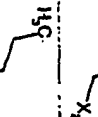
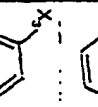
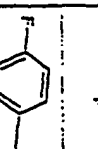

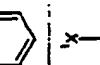
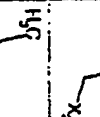
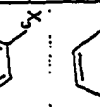
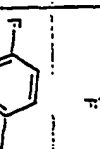
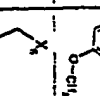

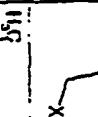
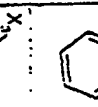
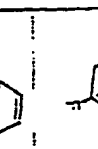



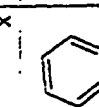
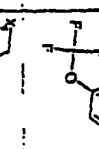

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1205							2.14	613.3144	614.3954
1206							2.13	543.325	544.4046
1207									
1208							2.05	487.2790	488.3539
1209							2.06	521.2643	522.3414
1290							2.05	651.2748	652.3503

1291							2.14	527.3112	528.4017
1292							2.14	519.2208	520.312
1293							2.13	503.2157	504.3151
1294									
1295									
1296							2.14	651.2604	652.3790
1297									
1298							2.03	407.2709	408.3520
1299							2.05	521.2643	522.3441

1300							2.08	551.2748	552.3575
1301							2.14	527.3112	520.3804
1302							2.14	519.2208	520.3089
1303							2.13	503.2157	504.3103
1304									
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1307							2.13	503.2157	504.3009
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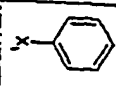
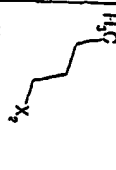
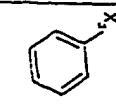
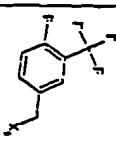
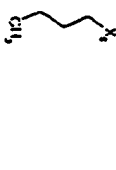
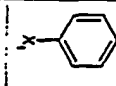

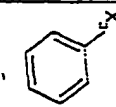
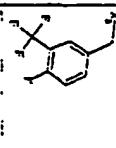
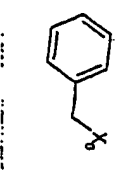
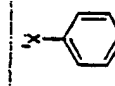

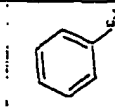
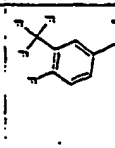
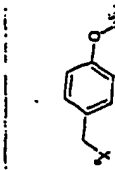
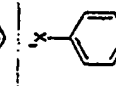

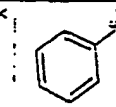
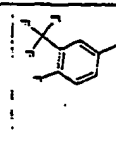
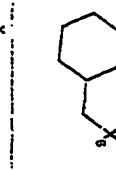
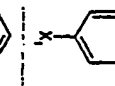
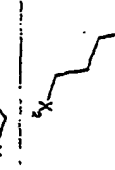
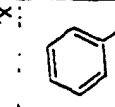
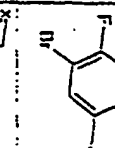
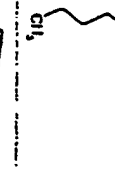
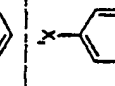
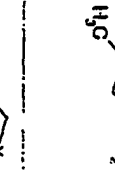
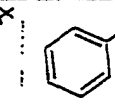
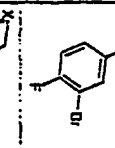
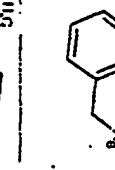
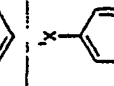

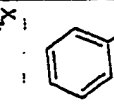
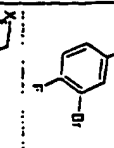
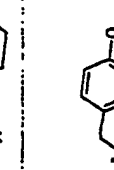
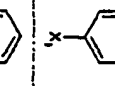
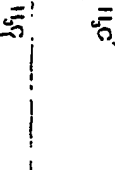
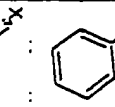
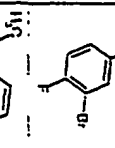
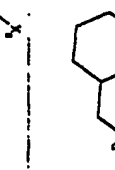
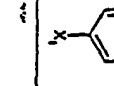

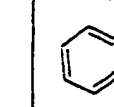
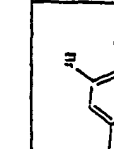

1309							2.11	503.2504	504.3201
1310							2.09	537.2347	538.3116
1311							2.09	567.2452	568.3202
1312							2.10	543.2017	544.3722
1313							2.08	487.2789	488.3511
1314							2.05	521.2643	522.3300
1315							2.08	551.2740	552.3557
1316							2.16	527.3112	528.3931
1317							2.07	487.2700	488.3400

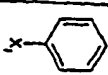

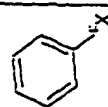
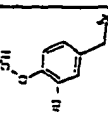
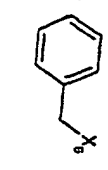
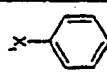

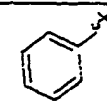
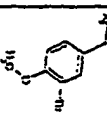
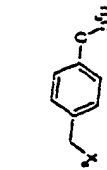
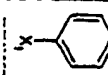

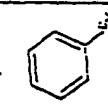
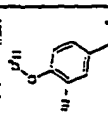
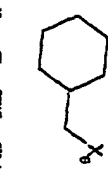
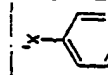
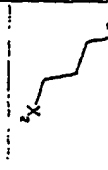
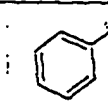


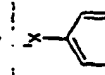

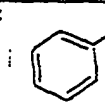
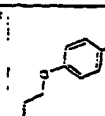
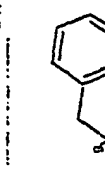
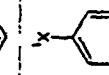

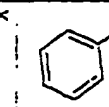
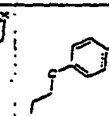
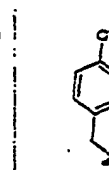
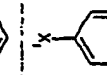

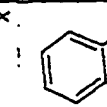
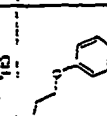

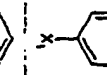
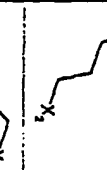
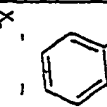
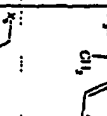
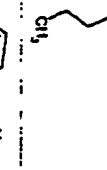

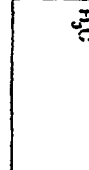
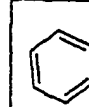
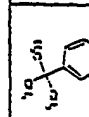
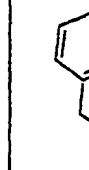


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1319							2.06	551.2740	552.3506
1320							2.14	527.3112	528.3830
1321							2.06	487.2709	488.3520
1322							2.06	521.2643	522.3411
1323							2.06	551.2740	552.3509
1324							2.17	527.3112	528.3807
1325							2.13	535.2011	536.38
1326							2.12	509.2054	570.3573

[illegible]

1.336							2.10	575.3124	576.4045
1.337							2.08	487.2788	488.3532
1.338							2.00	521.2043	522.3442
1.339							2.07	551.2740	552.3500
1.340							2.16	527.3112	528.3904
1.341							2.1	503.2504	504.3321
1.342							2.1	537.2347	538.3232
1.343							2.1	567.2452	568.3306
1.344									

1345							2.09	537.2767	530.3024
1346							2.09	571.261	572.3517
1347							2.08	601.2710	602.369
1348							2.16	577.300	578.4044
1349							2.1	547.1980	548.2905
1350							2.11	581.1842	582.20
1351							2.1	611.1948	612.3
1352							2.10	587.2311	590.34
1353							2.05	559.2180	560.31

1354										
1355								2.08	023.2147	024.31
1356										
1357								2.02	509.3406	510.4212
1358								2.14	543.325	544.3002
1359								2.13	573.3355	574.4330
1360										
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1362								2.18	541.3457	542.4313

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1.364									
1.365							1.98	499.2999	500.369
1.366							2.05	533.2042	534.366
1.367							2.04	563.2940	564.3709
1.368									
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1.370							1.93	437.2031	438.3402
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1:172						2.03	501.1779	502.2507
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1:176						2.01	455.2737	456.3350
1:177						2.05	469.2893	470.3576
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


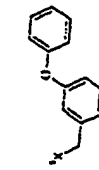

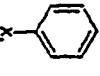

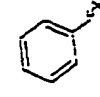
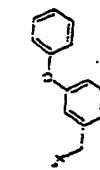
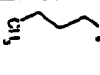



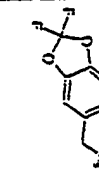

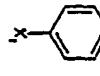

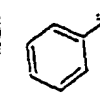
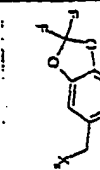
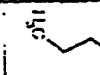



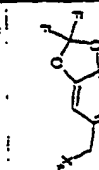


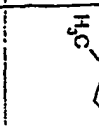

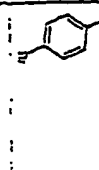


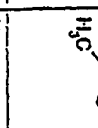

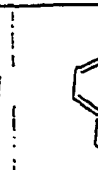


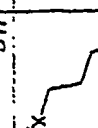

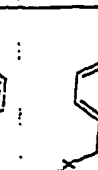




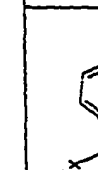

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1302					2.02	451.2987	452.3678
1303					1.05	467.2037	468.3646
1304					1.00	481.3093	482.3853
1305					2.04	491.2540	492.3256
1306					2.07	505.2705	506.3484
1307					2.11	519.2801	520.37
1308					1.04	467.2937	468.3647
1309					1.91	481.3093	482.3842



1390						1.06	405.325	406.4054
1391						2.13	505.2051	506.2900
1392						2.10	519.2208	520.3135
1393						1.81	497.3042	498.3747
1394						1.06	511.3109	512.4008
1395						1.8	403.2806	404.2823
1396						1.06	497.3042	498.2973
1397						1.91	511.3109	512.3108
1398						2.01	501.1779	502.1894

1:99							2.06	515.1038	516.206
1:100							2.00	529.2093	530.222
1:101							1.94	441.2558	442.2664
1:102							2	455.2737	456.20
1:103							2.03	469.2803	470.2826
1:104							1.0	437.2831	438.2825
1:105							1.98	451.2987	452.3093
1:106							2	465.3144	466.3223
1:107							2	491.2540	492.2603

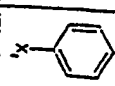
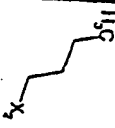
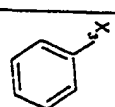
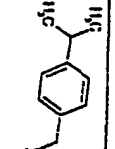
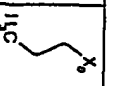
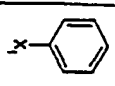

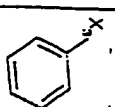
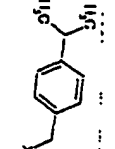
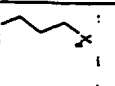
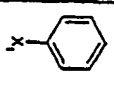
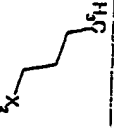
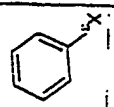
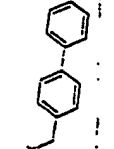
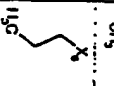
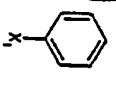

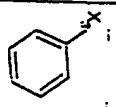
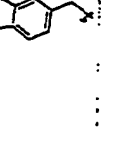
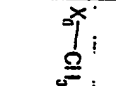
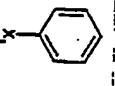

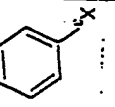
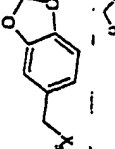
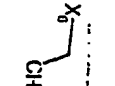
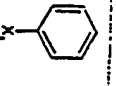
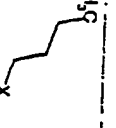
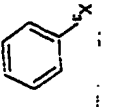
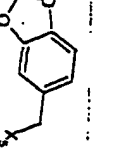
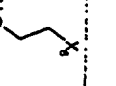
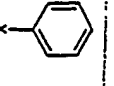
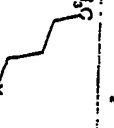
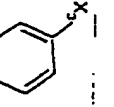
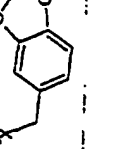
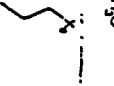
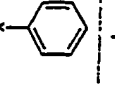

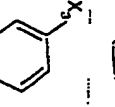
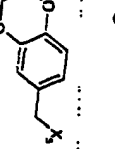
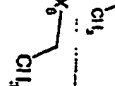
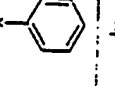
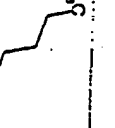
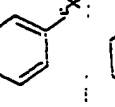
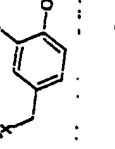
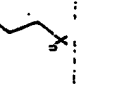
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1409							2.08	519.2061	520.2956
1410									
1411							1.95	467.2837	468.1446
1412							1.98	481.3003	482.2171
1413							2	457.2285	458.1478
1414							2.04	471.2441	472.1711
1415							2.09	485.2508	486.1973
1416							2.05	516.2036	518.2304

1417							2.09	529.3003	530.2510
1418							2.12	543.385	544.2772
1419							2	503.2304	504.2027
1420							2.06	517.2541	518.2202
1421							2.00	531.2697	532.2490
1422							1.90	407.1623	408.1573
1423							1.90	501.1770	502.1747
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1425							2.09	529.2093	530.21

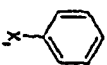

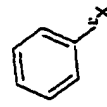
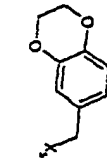
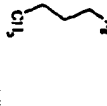
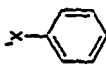

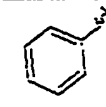
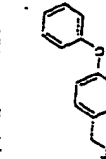
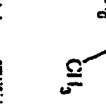
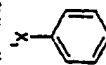

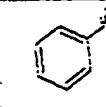
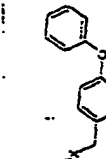
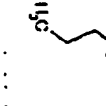
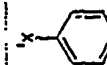
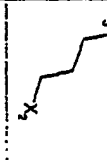
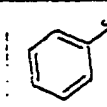
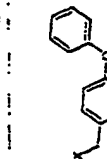
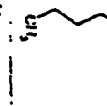
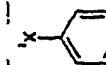

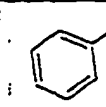
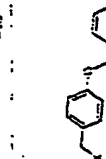
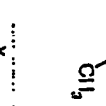
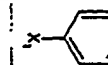
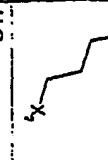
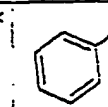
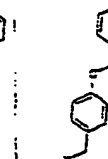
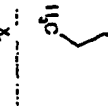
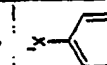
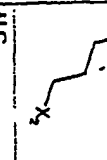
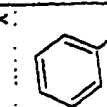
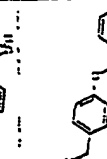
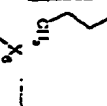
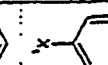
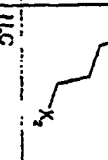
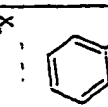
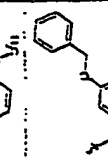
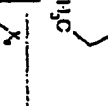
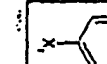

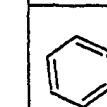
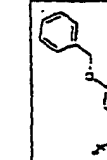

1426						1.09	441.250	442.2531
1427						1.85	455.2737	456.2700
1428						2	469.2093	470.2080
1429						1.90	457.2205	458.2378
1430						2.03	471.2441	472.2011
1431						2.00	485.2500	486.2763
1432						1.00	437.2031	438.2931
1433						1.94	451.2087	452.3127
1434						1.90	485.3144	486.3360

Chemical Structure	$\delta$ (ppm)	$\nu$ (cm <sup>-1</sup> )	$\nu$ (cm <sup>-1</sup> )
	1.9	437.2031	430.2071
	1.93	451.2067	452.3104
	1.99	465.3144	466.3413
	2.03	479.33	480.3060
	1.01	453.270	454.3067
	1.08	467.2937	468.3209
	1.01	401.3093	402.3407
	1.07	467.2937	468.3278
	1.03	481.3093	482.3401

1444						1.95	495.325	496.3686
1445						1.95	491.3093	492.356
1446						1.97	495.325	496.3746
1447						2.03	509.3406	510.4019
1448						2.05	523.3563	524.4143
1449						2.05	505.2705	506.3109
1450						2.08	519.2861	520.3441
1451						1.95	451.2907	452.3453
1452						1.97	405.3144	406.3662

1453							2.03	479.33	400.3038
1454							2.07	493.3457	494.4073
1455							2.07	513.3144	514.367
1456							1.0	453.2418	454.2823
1457							1.03	467.2573	468.2891
1458							1.9	481.2729	482.3106
1459							1.94	495.2806	496.3361
1460							1.82	481.2729	482.3166
1461							1.89	485.2806	486.3342



1462							1.93	600.3042	510.3951
1463							2	515.2936	516.3542
1464							2.07	620.3093	530.368
1465							2.00	543.325	544.3920
1466							1.96	529.3093	530.3663
1467							2.02	543.325	544.387
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1469							1.97	573.3355	574.3986
1470							2.01	507.3512	508.4052

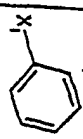

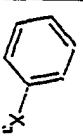
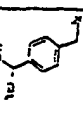

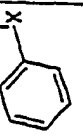
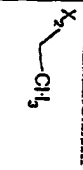
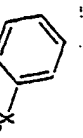
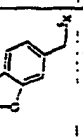

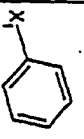
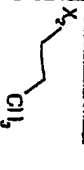
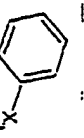
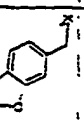

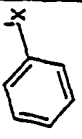
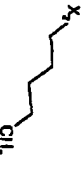
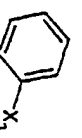
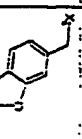

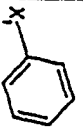
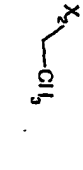
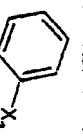
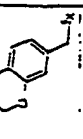

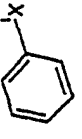
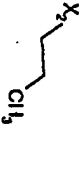
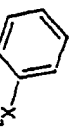
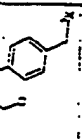
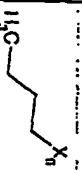
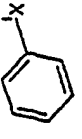
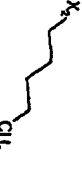
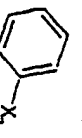
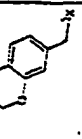
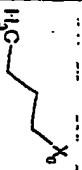
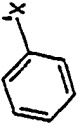
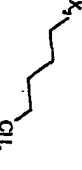
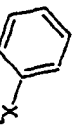
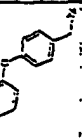

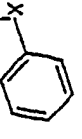
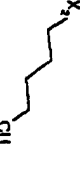
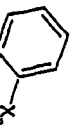
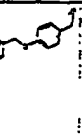

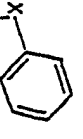
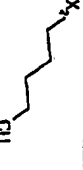
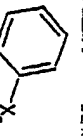
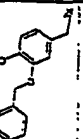
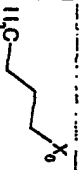
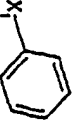
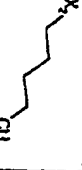
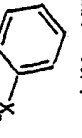
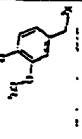
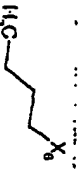
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1472									
1473									
1474							1.07	497.3042	498.347
1475							1.01	511.3199	512.3705
1476							1.05	511.3199	512.367
1477							1.93	437.2031	438.3206
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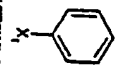
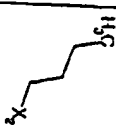
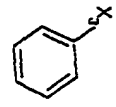
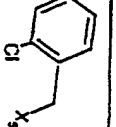
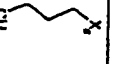
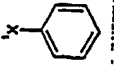
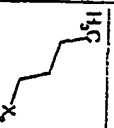
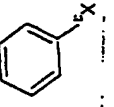
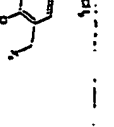

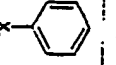
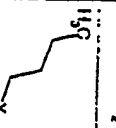
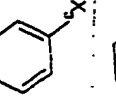
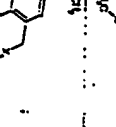

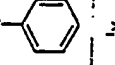
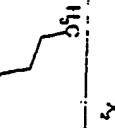
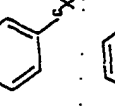
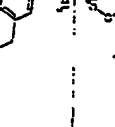

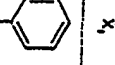

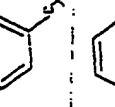
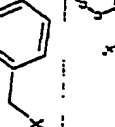

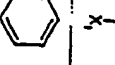
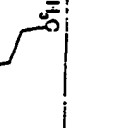
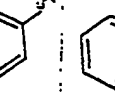
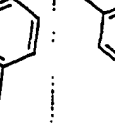
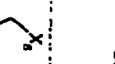
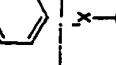
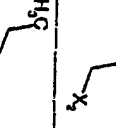
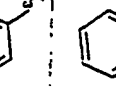
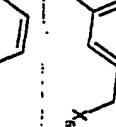
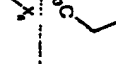
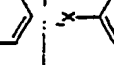

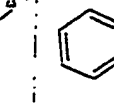
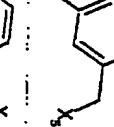
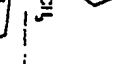
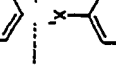
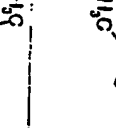
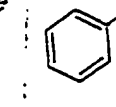
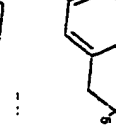

[illegible]

1492							1.01	487.3042	488.330
1493							1.09	525.3355	520.3015
1494							1.08	497.3042	490.333
1495							1.94	525.3355	520.3023
1496							2	455.2737	450.3007
1497							1.95	451.2807	452.3012
1498							2.05	470.33	480.3012
1499							1.85	467.2937	460.3324
1500							2.02	495.325	486.3720
1501							2.00	471.2441	472.2934
1502							2.05	515.1030	510.24




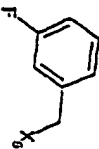




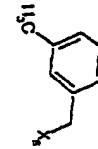


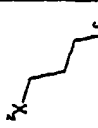

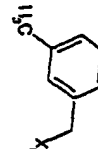




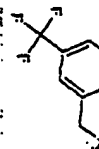




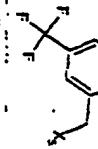


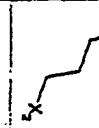

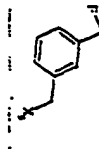


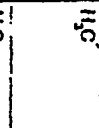

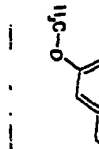

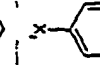
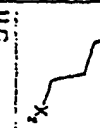
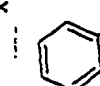
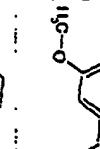
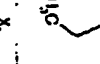



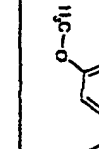

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1504							1.95	455.2737	456.315
1505							2.04	403.305	404.3472
1506							2.04	471.2441	472.2807
1507							2.1	499.2764	500.3232
1508							1.93	437.2031	438.3264
1509							1.94	451.2807	452.3422
1510							2.03	479.33	480.3817
1511							1.94	437.2031	438.3264
1512							1.90	451.2807	452.3440
1513							2	405.3144	406.3607

1514									
1515							1.07	467.2937	468.338
1516							1.06	465.325	466.3754
1517							1.9	467.2837	468.3403
1518							1.02	461.3093	462.358
1519							2	509.3406	510.3971
1520							2.03	509.3406	510.3994
1521									
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1523							2.01	465.3144	466.3678
1524							2.04	479.33	480.3809




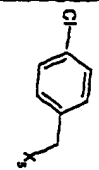




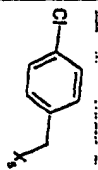

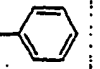

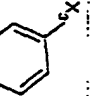
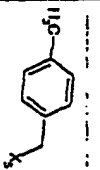


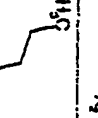

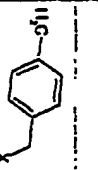




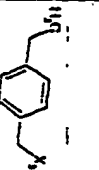


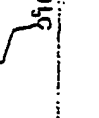

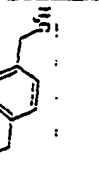


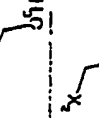

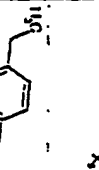


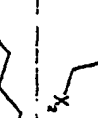

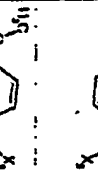

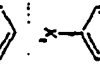
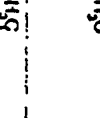
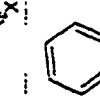
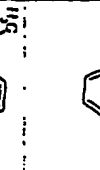
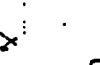
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1526							1.08	467.2673	468.2800
1527							1.91	461.2720	482.3157
1528							1.98	509.3042	510.3497
1529							1.08	481.2729	482.3152
1530							1.89	486.2006	490.3300
1531							1.97	523.3189	524.3052
1532									
1533									
1534							2.04	601.3668	602.4150
1535							1.9	625.3955	626.3854




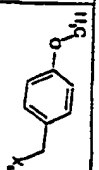
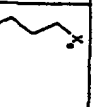



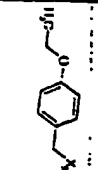




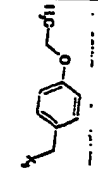
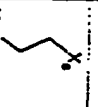



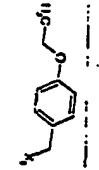
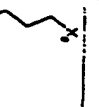



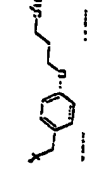
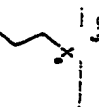
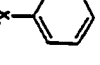
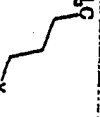
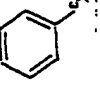
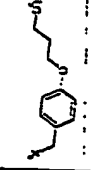
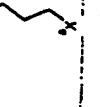



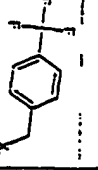
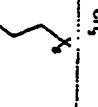



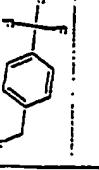
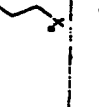



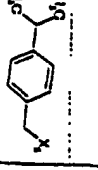
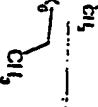
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1537							1.0	483.2886	484.3271
1538							1.06	487.3042	488.3417
1539							1.91	511.3189	512.3689
1540							2.02	501.1778	502.23
1541							2.07	515.1836	516.24
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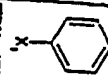
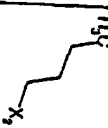
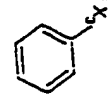
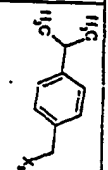
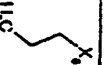
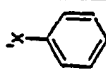
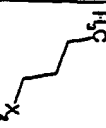
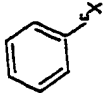
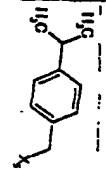
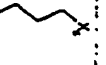
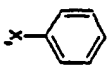
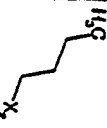
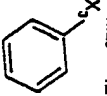
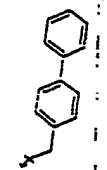
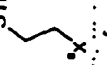
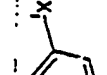
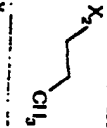
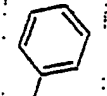
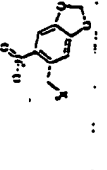

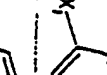

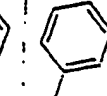
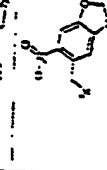


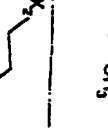
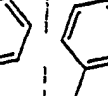
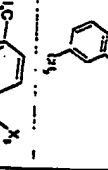

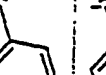
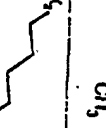
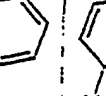
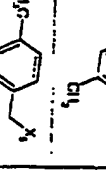
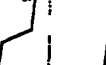
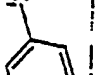
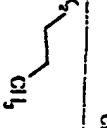
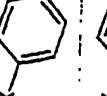
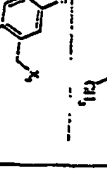

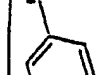

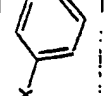
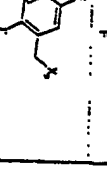








1545							2.04	469.2093	470.3382
1546							1.97	451.2807	452.3466
1547							2	465.3144	466.3600
1548							2.01	481.2540	482.3076
1549							2.08	565.2705	566.3239
1550							2.09	518.2801	520.3427
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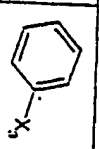
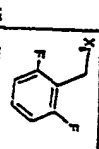

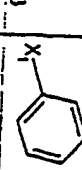
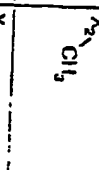
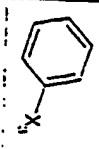
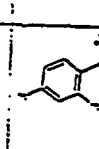

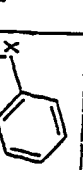
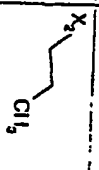
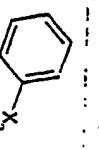
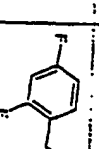
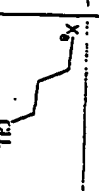
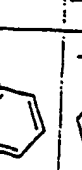
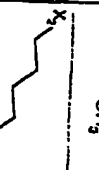
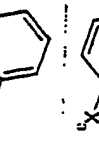
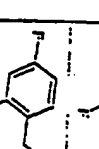
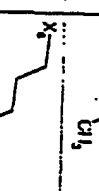
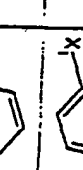
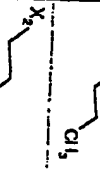
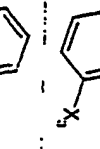
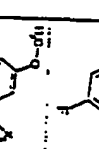
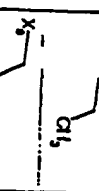
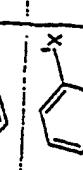
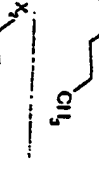
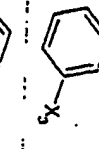
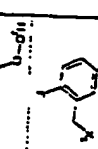
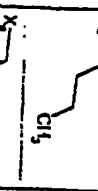
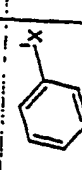
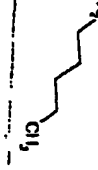
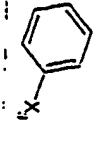
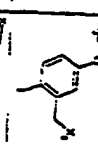

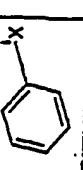

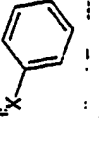
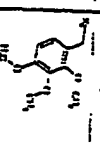

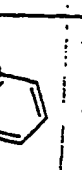
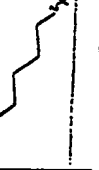
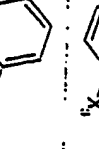
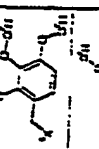
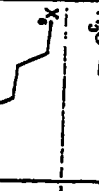
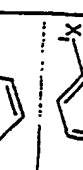

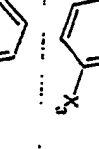
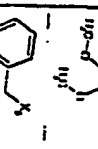
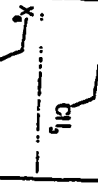
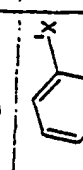
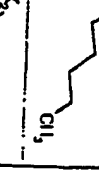
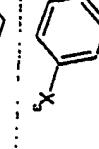
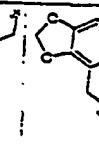

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1556						2.09	405.2390	406.3070
1557						2.11	520.3093	530.3656
1558						2.05	516.1936	516.25
1559						2.09	529.2093	530.2716
1560						1.97	455.2737	456.3232
1561						2	409.2093	470.3403
1562						1.90	457.2205	458.2803

1563							2.03	471.2441	472.2929
1564							2.07	485.2598	486.3040
1565							1.95	451.2907	452.3467
1566							1.99	405.3144	406.3094
1567							1.94	451.2907	452.3402
1568							2	405.3144	406.3705
1569							2.04	479.33	480.3840
1570							1.91	453.270	454.3195
1571							1.00	407.2937	408.3429

1572							1.92	491.3093	492.350
1573							1.87	497.2937	499.3413
1574							1.92	491.3093	492.3046
1575							1.96	495.325	496.393
1576							2.03	509.3409	510.391
1577									
1578							2.05	505.2705	506.3306
1579							2.09	519.2901	520.3426
1580							1.98	495.3144	496.3670

1501									
1502									
1503									
1504									
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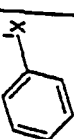
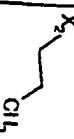
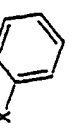


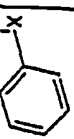

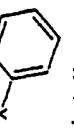
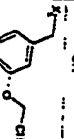
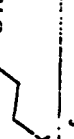
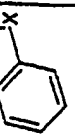
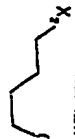

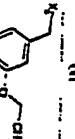
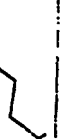
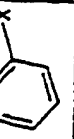
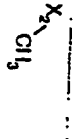
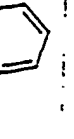
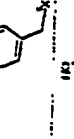
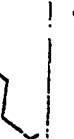
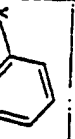
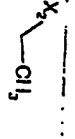
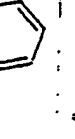
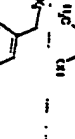
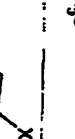

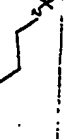
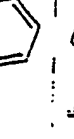
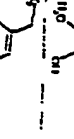
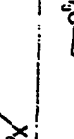
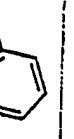

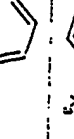
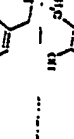

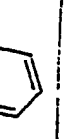
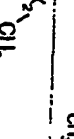
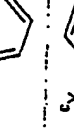
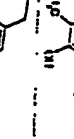
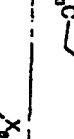
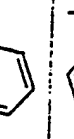
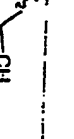
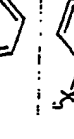
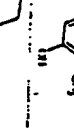
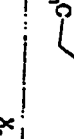
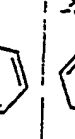

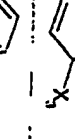
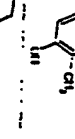
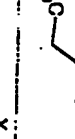
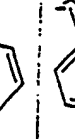
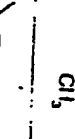
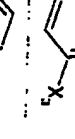
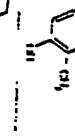
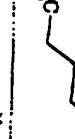
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1592						2.11	505.2051	506.2504
1593						2.10	533.2305	534.3010
1594						2.00	475.2101	470.2501
1595						2.09	499.2347	490.2856
1596						2.14	517.256	510.3105
1597						2.04	473.2643	474.3057
1598						2.1	501.2950	502.3344
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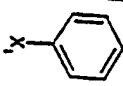
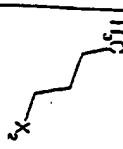
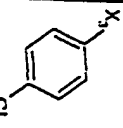
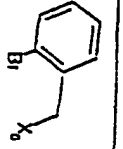
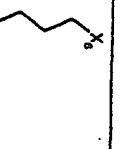
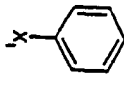
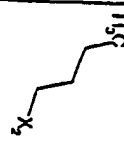
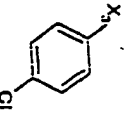
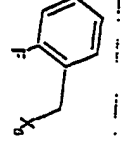
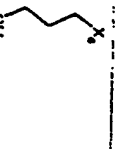
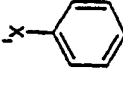

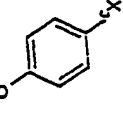
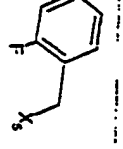
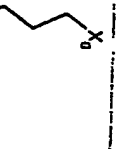
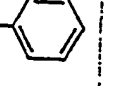
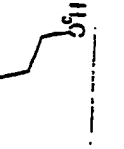
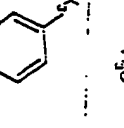
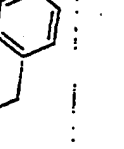
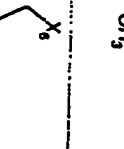
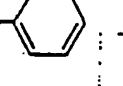
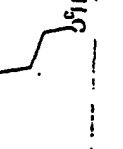
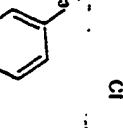
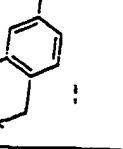
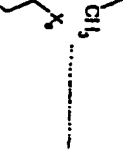
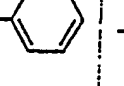
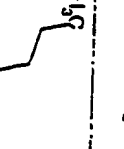
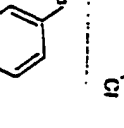
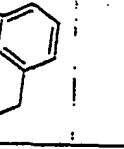
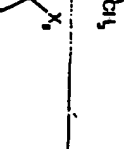
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1604							2.03	473.2643	474.3020
1605							2.1	501.2956	502.3305
1606							2.03	485.2042	486.2431
1607							2.09	513.3160	514.3523
1608							1.95	527.3140	528.3573
1609							1.93	555.3401	556.3820
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1611							1.9	487.2937	488.3323
1612							1.92	401.3093	402.3560

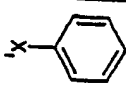
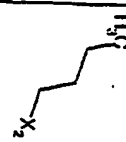
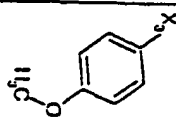
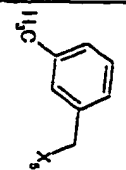
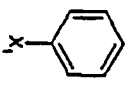
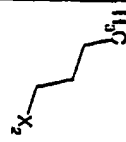
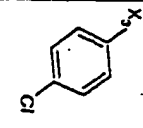
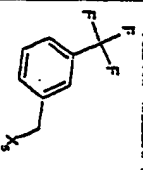
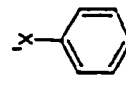
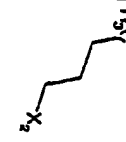
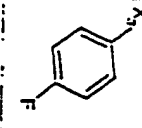
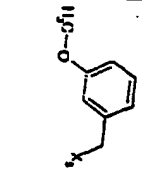
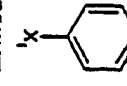
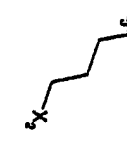
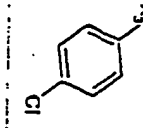
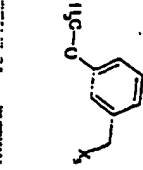
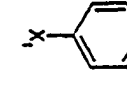
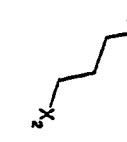
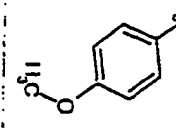
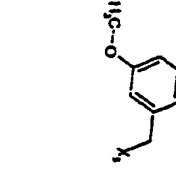
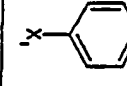
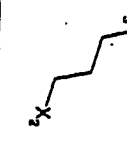
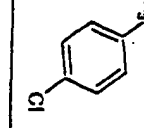
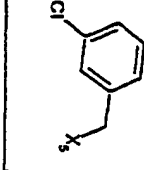
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1615							1.06	539.3512	540.4002
1616							2.05	491.2540	492.3016
1617							2.07	523.261	524.3156
1618							1.09	401.3003	402.3597
1619							2	495.325	496.3762
1620							2.07	523.3563	524.4204
1621							2.02	531.2653	532.3105
1622							2.09	559.2906	560.3560
1623							2.09	499.2347	499.2897



1624							2.14	617.200	510.3209
1625							1.87	525.3355	526.3039
1626							1.08	511.3190	512.3005
1627							1.03	497.3042	490.3402
1628							1.91	525.3355	526.3053
1629							1.05	511.3199	512.3710
1630							1.96	501.1991	502.2613
1631							2.03	509.2304	590.20
1632							1.08	467.2937	460.3345
1633							1.97	485.325	496.3700
1634							1.77	453.270	454.3150

1635							1.01	407.2937	408.3360
1636							1.01	407.3042	408.3435
1637							1.09	526.3355	528.3045
1638							1.77	453.270	454.3210
1639							1.0	407.2937	408.3422
1640							1.02	401.3093	402.3600
1641									
1642							1.73	439.2024	440.3095
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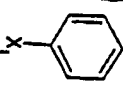
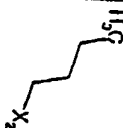
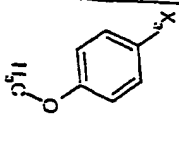
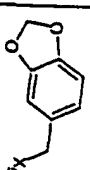
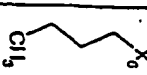
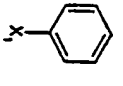
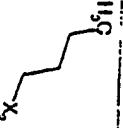
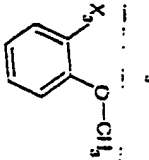
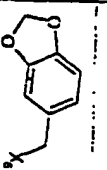
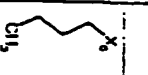
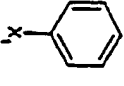

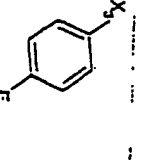
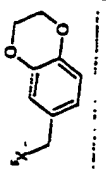
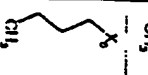
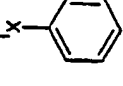

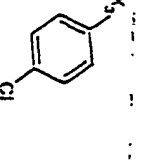
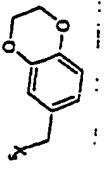
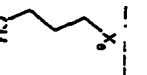
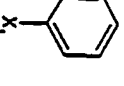

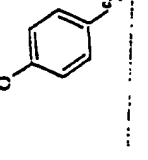
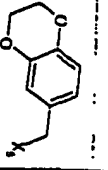
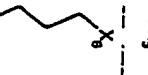
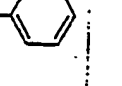

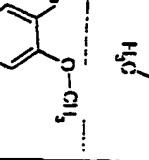
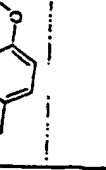

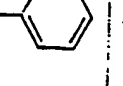

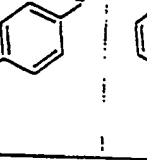
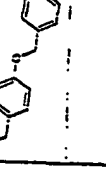
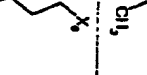
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1647									
1648							2.06	489.2989	500.3384
1649									
1650							2.16	553.1018	554.31
1651									

1652							2.01	495.325	499.3744
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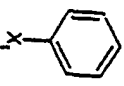
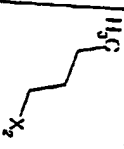
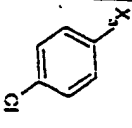
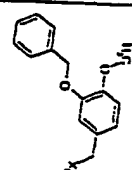

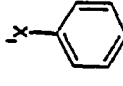
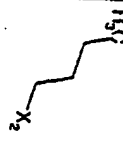
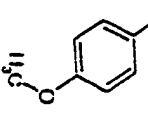
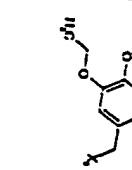
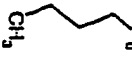
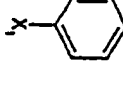

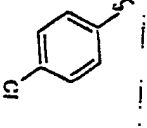
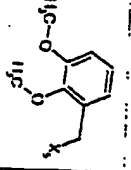
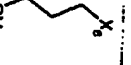
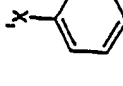

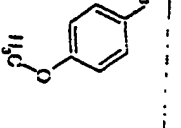
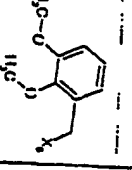

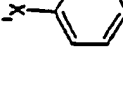
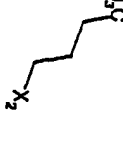
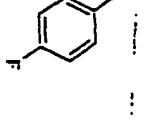
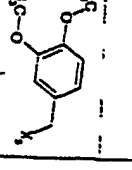

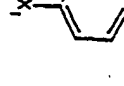
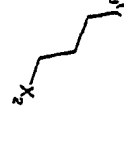
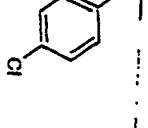
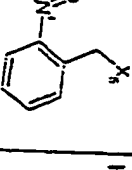

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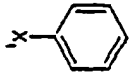
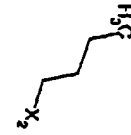
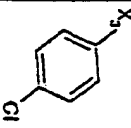
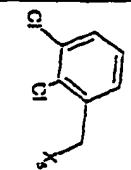
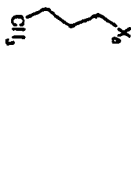
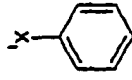

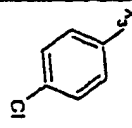
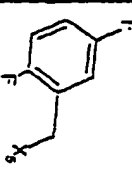
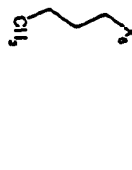
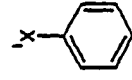
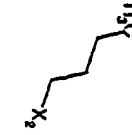
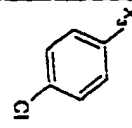
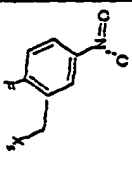
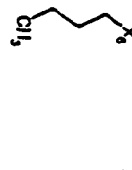
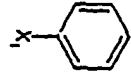

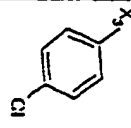
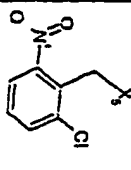

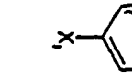

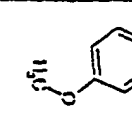
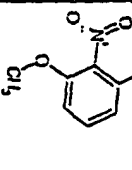

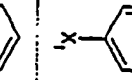
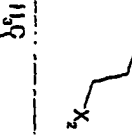
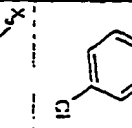
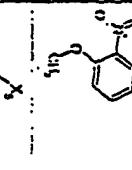

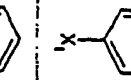
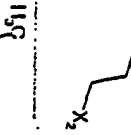
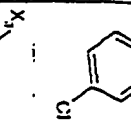
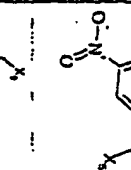
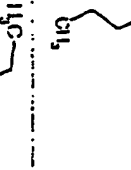
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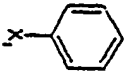
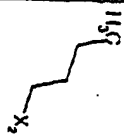
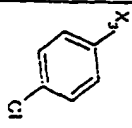
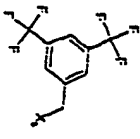
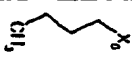
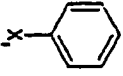
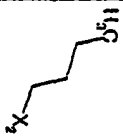
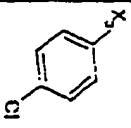
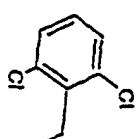

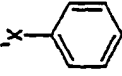
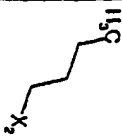
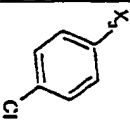
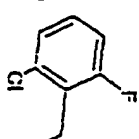

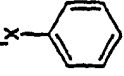
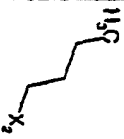
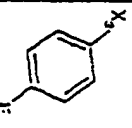
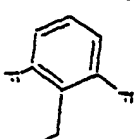

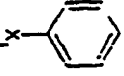
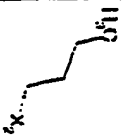
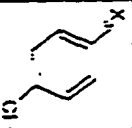
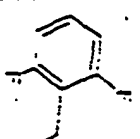

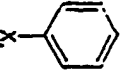
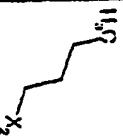
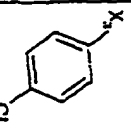
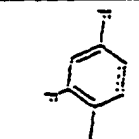

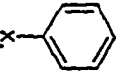
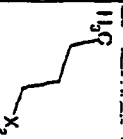
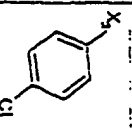
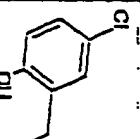

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1675								

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1601									
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1601									

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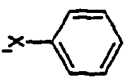
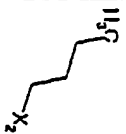
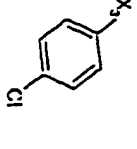
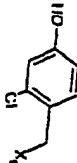

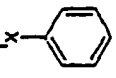
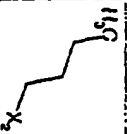
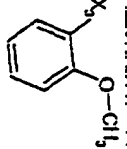
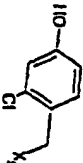

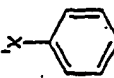
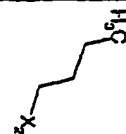
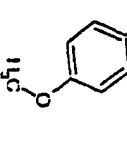
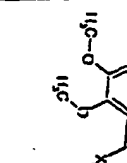

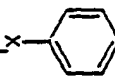
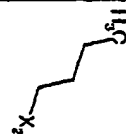
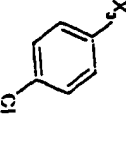
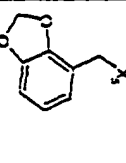
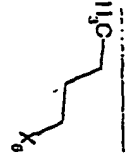
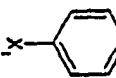
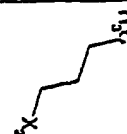
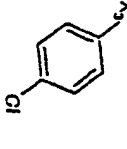
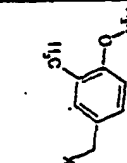

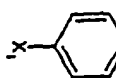
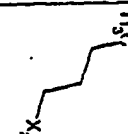
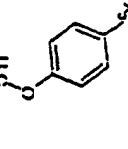
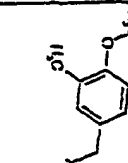

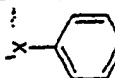

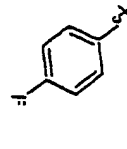
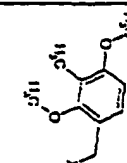

1696									
1697							2.16	653.1010	654.31
1698									
1699							2.09	606.2705	600.3203
1700									
1701									
1702									

1703									
1704									
1705									
1706									
1707									
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1709									

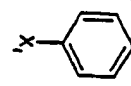

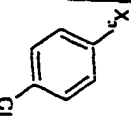
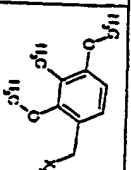
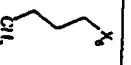
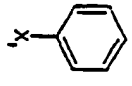
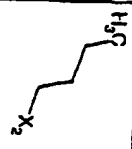
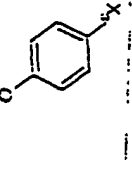
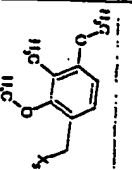

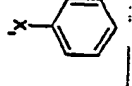
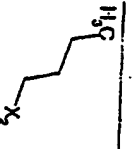
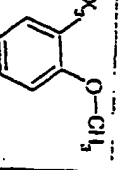
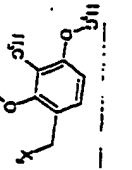

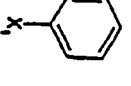

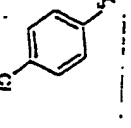
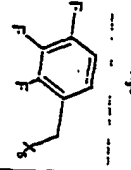

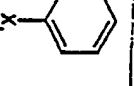

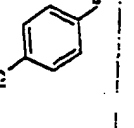
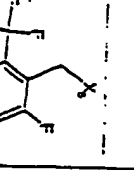

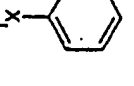

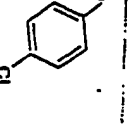
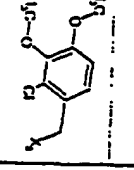

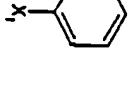
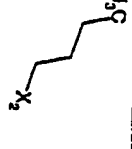
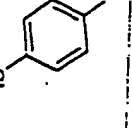
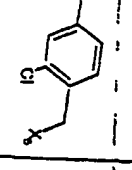

1710						1.09	513.3156	514.3675
1711								
1712						1.06	525.3355	520.3807
1713								
1714						1.00	499.2809	500.3502
1715								
1716						1.03	511.3109	512.3775

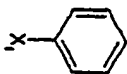

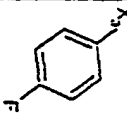
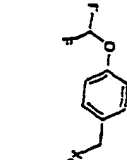

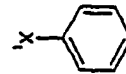

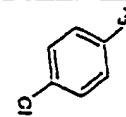
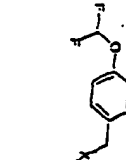

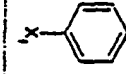
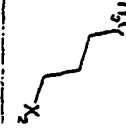
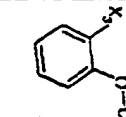
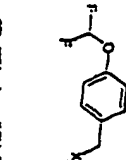

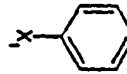

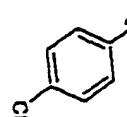
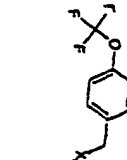

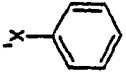

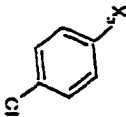
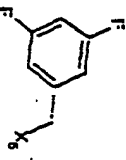

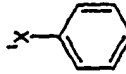

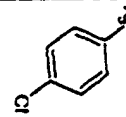
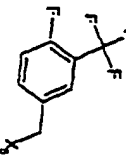

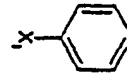

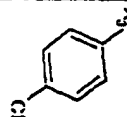
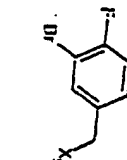

1717										
1718										
1719									1.91	405.2842 400.3395
1720										
1721									1.00	407.3042 400.3503
1722										
1723									1.00	515.2040 510.3523

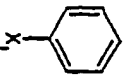
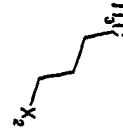
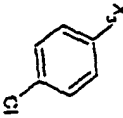
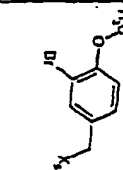
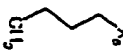
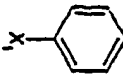
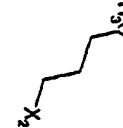
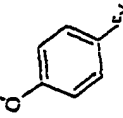
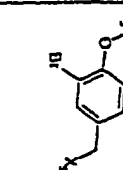


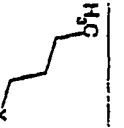
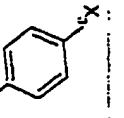
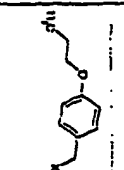
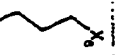
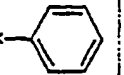
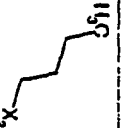
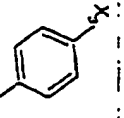
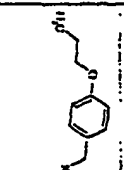
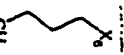
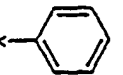
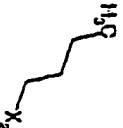
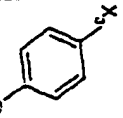
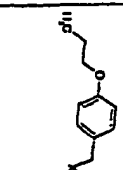

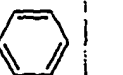

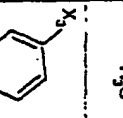
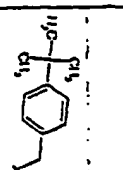
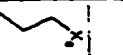
1724										
1725								1.03	485.2042	486.3419
1726								1.8	487.3042	488.3629
1727										
1728								1.03	515.2940	516.3555
1729										
1730								2.04	519.2452	520.3127

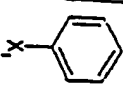
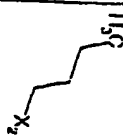
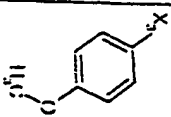
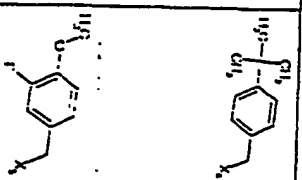
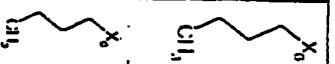
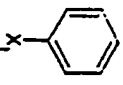
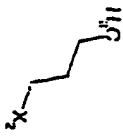
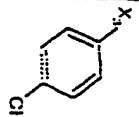
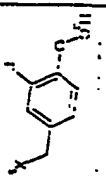
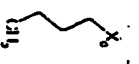
1731									
1732									
1733							1.88	571.341	572.4042
1734									
1735									
1736							1.96	525.3355	526.3064
1737							1.90	543.3201	544.3817



1738										
1739								1.02	655.3401	650.3902
1740										
1741										
1742										
1743										
1744										

1745							2.02	535,2011	530,3470
1746									
1747									
1748									
1749									
1750									
1751									

1752									
1753							2.07	509.2304	509.3111
1754							2.04	527.3312	528.3009
1755									
1756							2.02	539.3512	540.4099
1757									

1/50										
1/59								2.1	537.3710	530.4340

CMP #	R1	R2	R3	R4	R5
1800					
1801					
1802					
1803					
1804					

Cmp. #	Mass	Ion Obs.
531.2158	532.2805	
559.2471	560.3251	
565.2132	566.2751	
516.2573	516.3182	

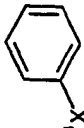

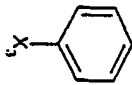
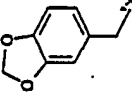
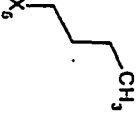
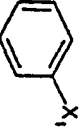

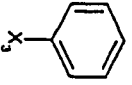
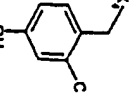
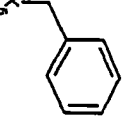
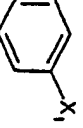
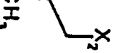
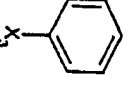
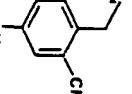
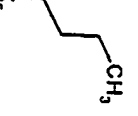
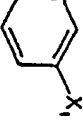
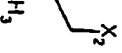
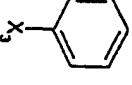
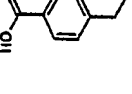
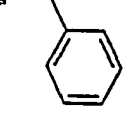
1805						1.87	481.2729	482.34
1806						2.01	521.2234	522.2003
1807						1.91	487.239	488.3032
1808						2.07	515.2573	516.2009

TABLE 4								
Comp #	R1	R2	R3 and R4	R5	R6	Run. Time	Comp. Mass	11+ Ion Obs
1809						2.04	493.2729	494.3307
1810						2.02	499.239	500.3034
1811								
1812								
1813								
1814						2.01	485.2234	486.3
1815								

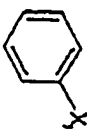


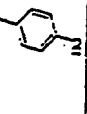

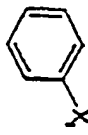


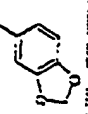

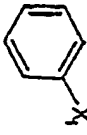


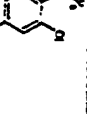

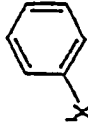


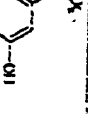

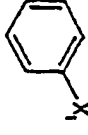


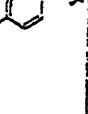

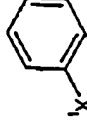


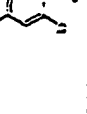




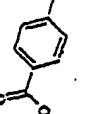

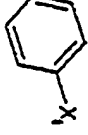


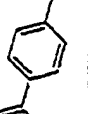

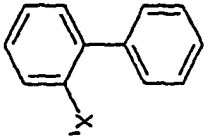
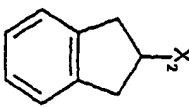
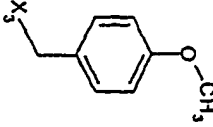
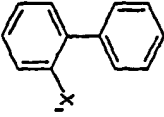
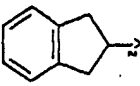
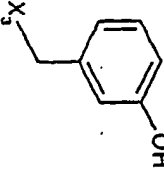
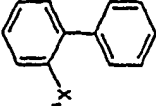
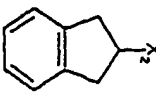
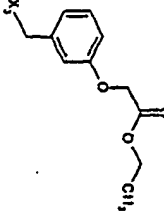
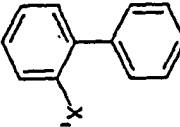
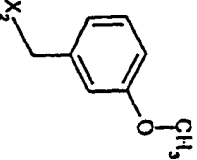
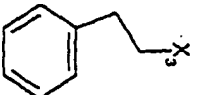
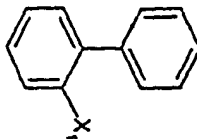
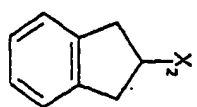
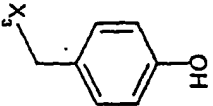
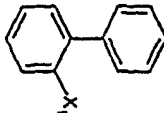
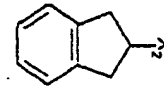
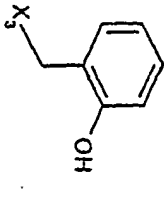
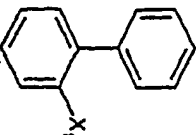
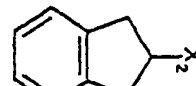
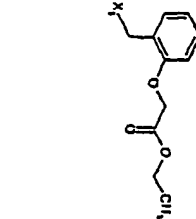
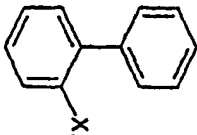
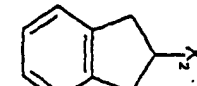
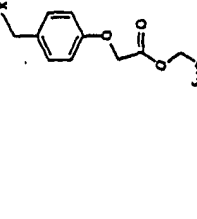
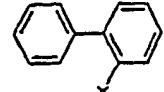
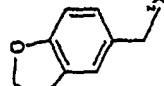
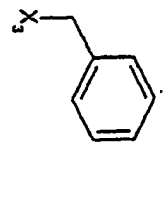
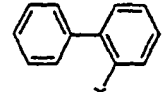
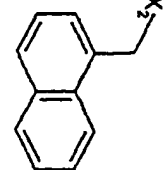
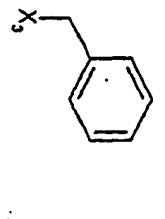
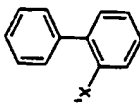
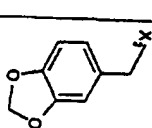
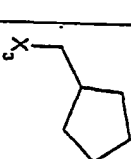
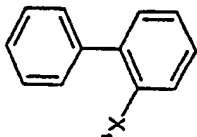
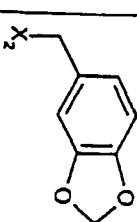
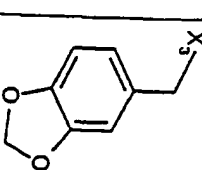
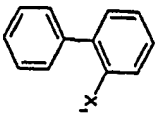
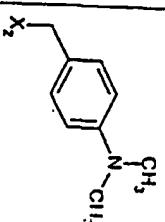
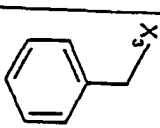
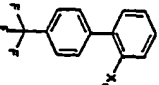
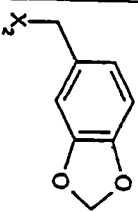
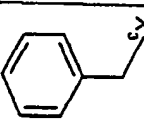
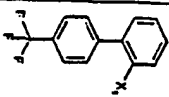
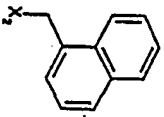
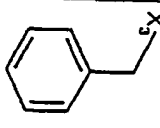
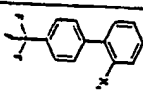
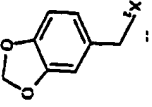
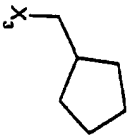
1016								
1017						2.05	521.3042	522.3520
1018						2.00	493.240	494.3401
1019						2.02	459.325	460.3719
1020						2.01	459.325	460.3708
1021						2.05	527.2703	528.3184
1022						2.01	501.3355	502.3353
1023						1.99	487.3189	488.3140



TABLE 5					
Comp #	R1	R2	R3	Rtn. Time	Comp. Mass (M+ Ion Obs)
1032				2	447.231 440.2516
1033				1.91	444.2413 445.2811
1034					
1035				2.36	433.2042 434.2552
1036				2.33	433.2042 434.2509

1837				2.33	433,2042	434,2613
1838				2.22	419,1885	420,2401
1839				2.3	505,2253	506,2785
1840				2.31	421,2042	422,2463
1841				2.2	419,1885	420,2424

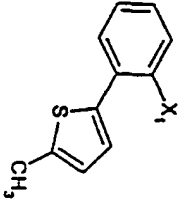
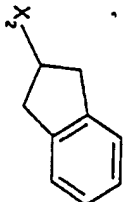
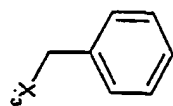
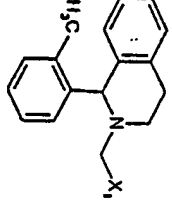
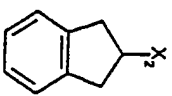
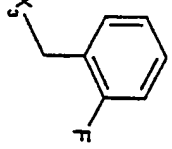
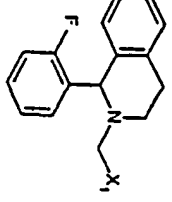
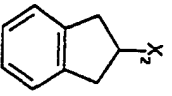
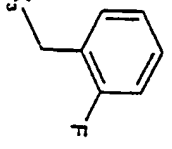
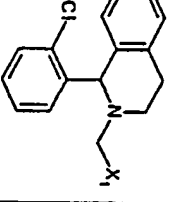
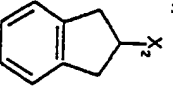
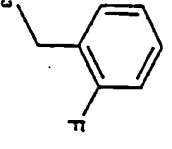
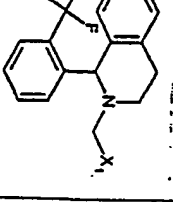
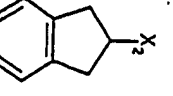
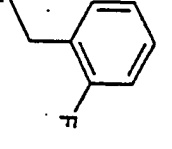
1842				2.27	419.1885	420.2401
1843				2.32	505.2253	506.2740
1844				2.3	505.2253	506.2814
1845				2.27	421.1678	422.2165
1846				2.4	427.1936	428.2449

1847				2.33	413.1991	414.2406
1848				2.25	465.1576	466.216
1849				2.12	420.2202	421.262
1850				2.33	489.1552	490.2146
1851				2.46	495.181	496.2438
1852				2.37	481.1865	482.2455

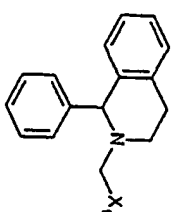
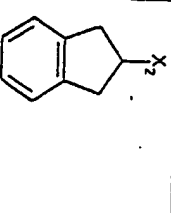
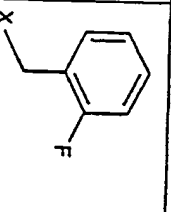
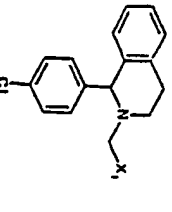
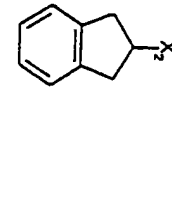
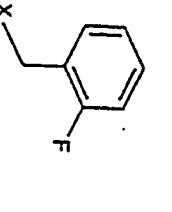
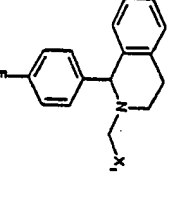
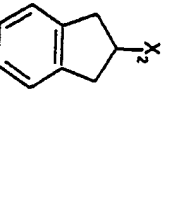
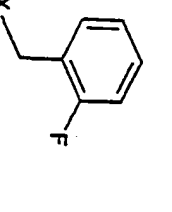
1853				2.17	488.2076	409.2776
1854				2.4	471.181	472.2344
1855				2.49	457.2042	458.2641
1856				2.4	443.2097	444.2538
1857				2.42	433.2042	434.2522
1858						

1859					
1860					
1861				2.17	490.2369 491.2785
1862				2.1	479.2321 480.2817
1863					

1864						
1865						
1866					2.15	485.2027 486.248
1867					2.29	472.1762 473.2223
1868					1.78	411.1583 412.1952
1869					2.44	443.1111 444.1614

1870				2.4	423.1657	424.1971
1871				2.11	504.2577	505.2372
1872				2.08	508.2326	509.2144
1873				2.21	524.2031	525.1942
1874				2.4	558.2294	559.21



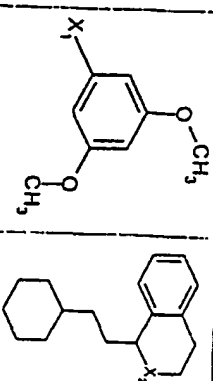
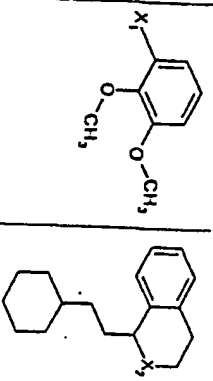
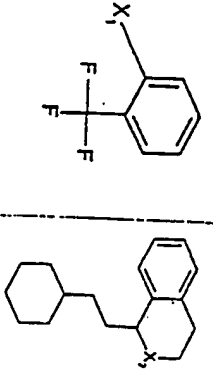
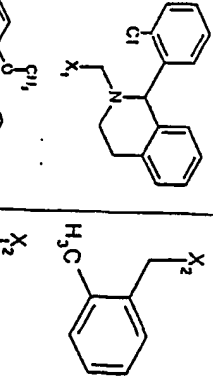
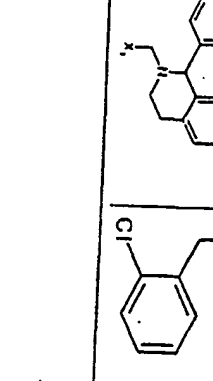
1875				2.01	490,242	491,2217
1876				2.11	524,2031	525,1987
1877				2.04	508,2326	509,2227

CMP #	TABLE 5			Run. Time	Emp. Mass	H + Ion Obs
	R1	R2	R3			
1878				2.43	417.2093	418.29
1879				2.42	417.2093	418.2941
1880				2.4	417.2093	418.2959
1881				2.35	421.1842	422.275
1882				2.53	411.2562	412.3455
1883				2.57	423.2562	424.3539
1884				2.42	437.1546	438.1642

1885				2.37	417.2093	418.2095
1886				2.41	417.2093	418.2095
1887				2.42	431.2249	432.2221
1888				2.48	517.0903	518.1107
1889				2.46	429.2093	430.2187
1890				2.48	429.2093	430.2192
1891				2.41	433.1842	434.2012
1892				2.46	469.1041	470.13

1893				2.21	549.1102	550.13
1894				2.49	393.2126	394.2145
1895				2.39	407.246	408.2380
1896				2.75	477.1837	478.2005
1897						
1898				2.6	525.1529	526.1517
1899				2.47	409.2406	410.246
1900				2.58	437.2719	438.2745

1901				2.38	433.2042	434.2162
1902				2.44	413.2355	414.2371
1903				2.42	413.2355	414.239
1904				2.39	413.2355	414.2406
1905				2.27	401.1991	402.2075
1906				2.28	401.1991	402.2055
1907				2.3	421.1445	422.163
1908				2.28	411.1446	412.1578

1909			2.47	407.246	408.2634
1910			2.45	407.246	408.2503
1911			2.46	415.2123	416.2204
1912			2.16	508.2281	509.2342
1913			1.99	524.2231	525.2272

1914			2.19	528.1735	529.1874
1915			2.38	562.1999	563.214
1916					
1917					
1918			2.13	494.2482	495.2661
1919					

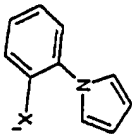
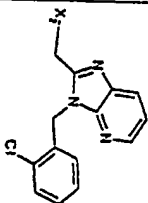
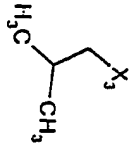
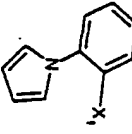
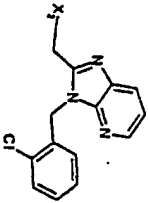
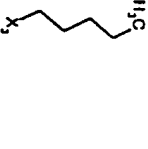
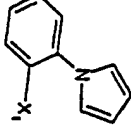
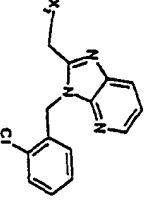
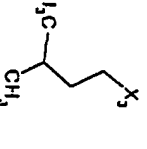
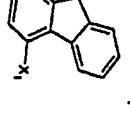
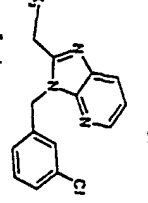
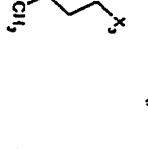
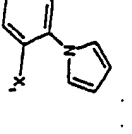
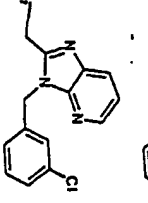
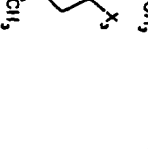
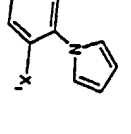
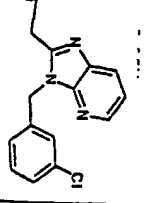
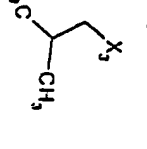
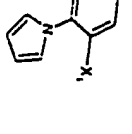
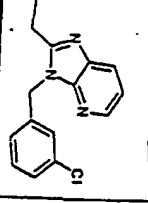
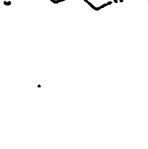
1920				2.13	449.2216	450.2522
1921				2.11	467.2121	468.2447
1922				2.14	467.2121	468.2424
1923				2.11	479.2321	480.2503
1924				2.52	400.2515	401.2748
1925				2.52	412.2515	413.2805

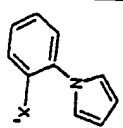
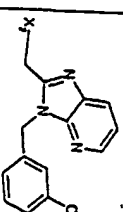
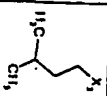
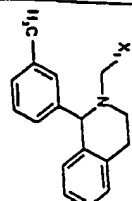
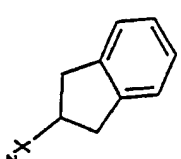
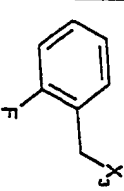
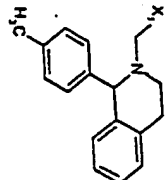
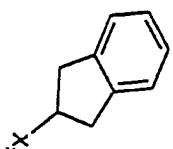
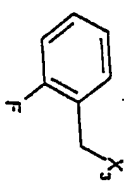
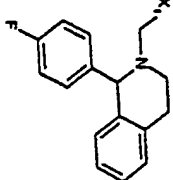
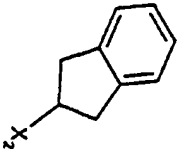
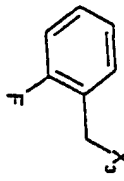
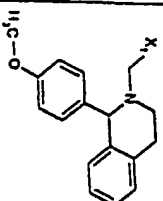
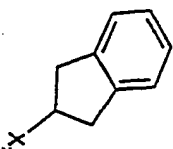
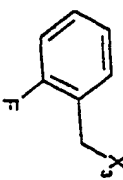
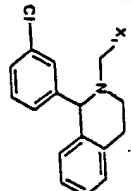
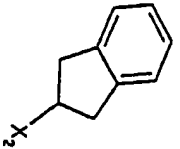
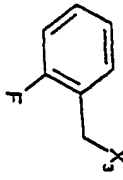


1926				2.28	346.2045	347.2321
1927				2.25	366.1732	367.2062
1928				2.11	531.3097	532.3127
1929				1.96	503.2243	504.2599
1930				2	517.2399	518.2693
1931				1.96	519.2534	520.2534

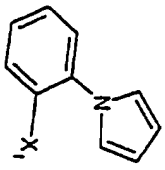
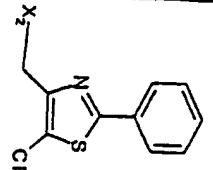
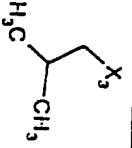
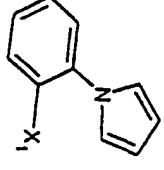
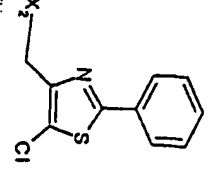
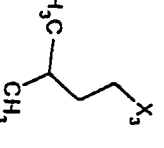
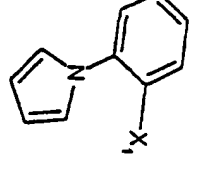
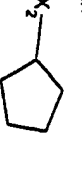
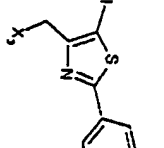
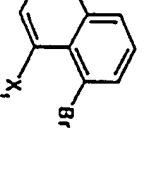
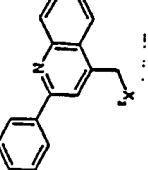

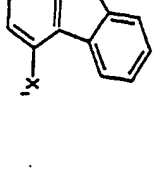
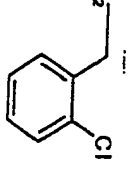
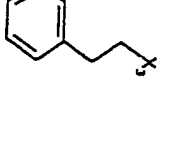
1932				2.02	505.2132	506.2226
1933				2.05	529.2941	530.2949
1934				2.03	529.2941	530.2936
1935				1.92	531.2733	532.2859
1936				1.91	531.2733	532.2828
1937				2.27	520.203	521.2229

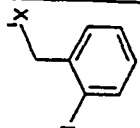
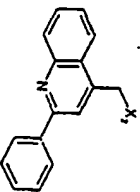
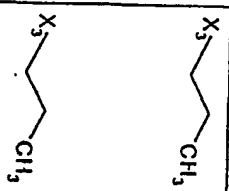
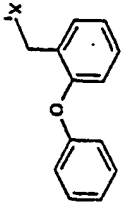
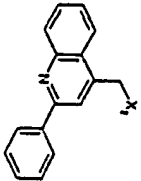
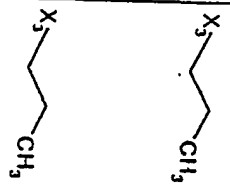
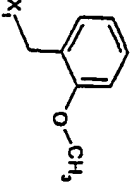
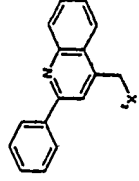
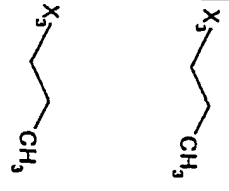
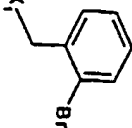
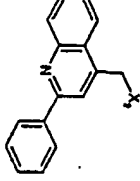
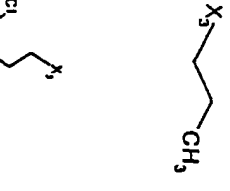
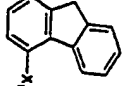
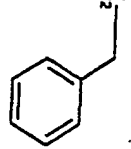
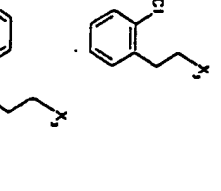
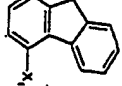
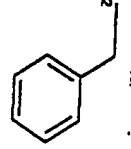
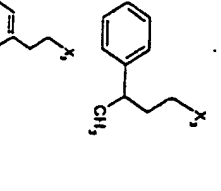
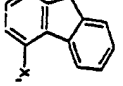
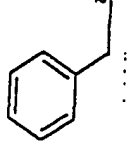
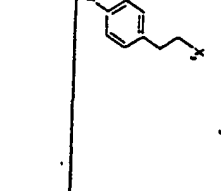
1938				2.25	520.203	521.2301
1939				2.32	534.2186	535.2426
1940				2.19	540.1695	541.1906
1941				2.23	560.0978	561.14
1942				2.23	560.0978	561.14
1943				2.28	574.1135	575.16
1944						

1945				2.19	497.1982	498.2381
1946				2.26	511.2139	512.2437
1947				2.25	511.2139	512.2531
1948				2.3	520.203	521.2333
1949				2.25	497.1982	498.2341
1950				2.25	497.1982	498.2305
1951				2.3	511.2139	512.2459

1952				2.3	511.2139	512.2452
1953				2.07	504.2577	505.2028
1954				2.07	504.2577	505.2755
1955				2.05	508.2326	509.2624
1956				2.03	520.2526	521.2831
1957						

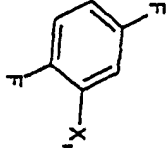
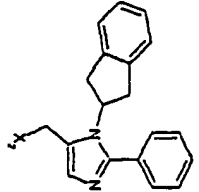
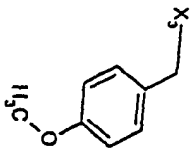
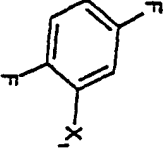
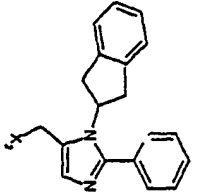
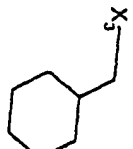
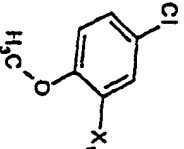
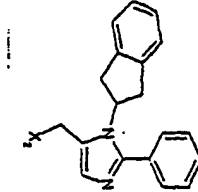
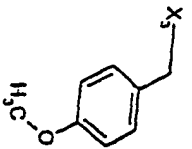
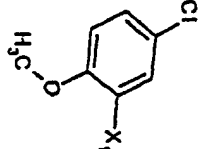
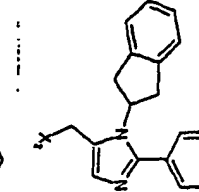
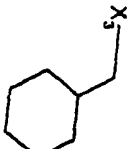
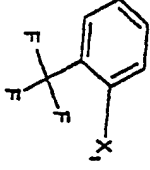
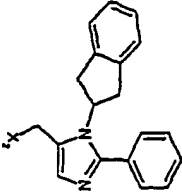
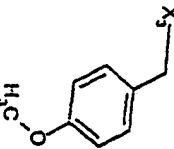
1958				2.05	486.2671	487.2196
1959				2.06	486.2671	487.2379
1960				2.02	502.262	503.2366
1961				2.55	507.098	508.09
1962				2.49	449.1329	450.125

1963				2.49	449.1329	450.1363
1964				2.55	463.1485	464.155
1965				2.5	461.1329	462.152
1966				2.13	508.115	509.1421
1967				2.39	437.1546	438.191

1968				2.1	520.1011	521.1198
1969				2.16	486.2307	487.2447
1970				2.01	424.2151	425.2368
1971				2.08	472.115	473.1456
1972				2.38	437.1546	438.1952
1973				2.37	431.2249	432.2486
1974				2.38	437.1546	438.1997

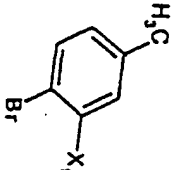
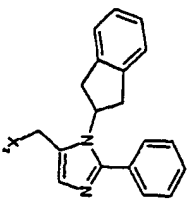
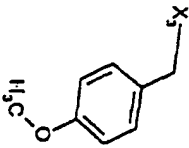
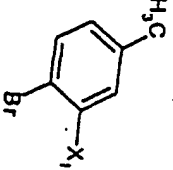
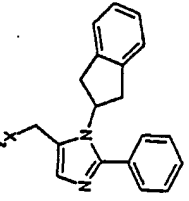
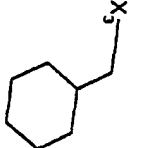
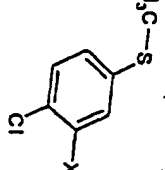
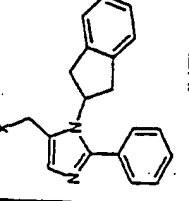
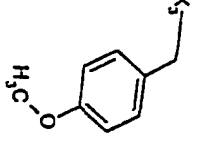
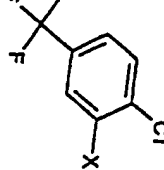
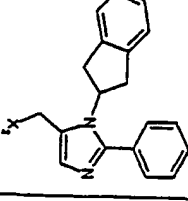
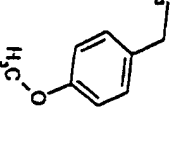
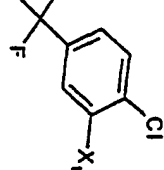
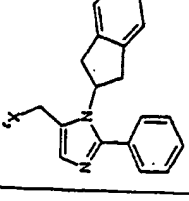
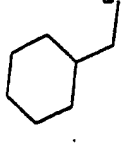


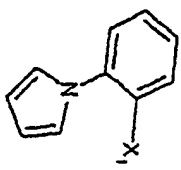
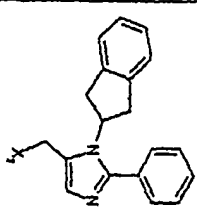
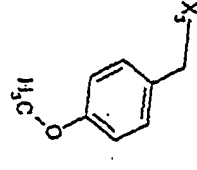
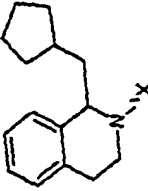
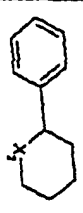
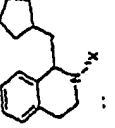
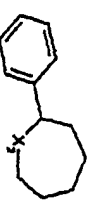
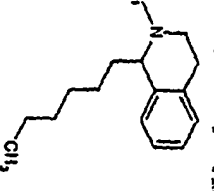
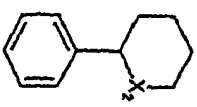
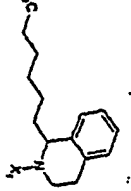
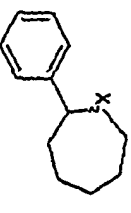
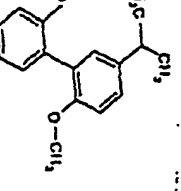
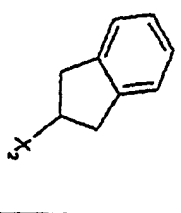

1975				2.33	403.1936	404.224
1976				2.36	415.1936	416.2279
1977				2.3	421.1842	422.218
1978				2.29	433.2042	434.2361
1979				2.32	447.2198	448.251
1980				1.08	547.2026	548.3105

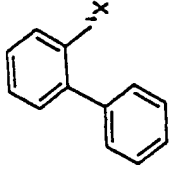
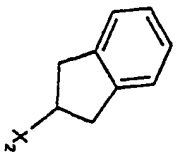

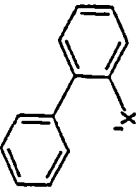
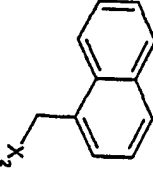
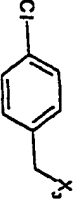
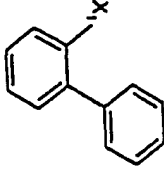
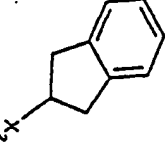

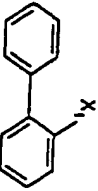
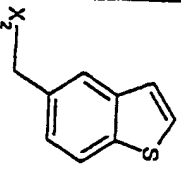
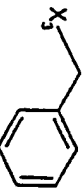
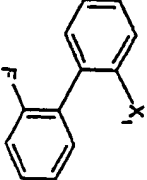
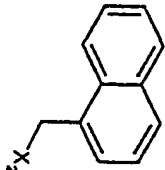
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1982					1.97	525.2592	526.3528
1983					1.94	577.2132	578.3243
1984					2.01	553.2486	554.3531
1985					1.92	561.229	562.3329

1986				1.95	551.1531	552.2697
1987				1.95	581.1637	582.2848
1988				2.03	557.2001	558.311
1989				1.9	591.1522	592.27
1990				2.02	617.3042	618.4236

1991				1.92	639.1383	640.2621
1992				1.95	607.2238	608.3556
1993				1.92	621.1627	622.29
1994				1.96	651.1733	652.31
1995				1.93	657.1288	658.2678

1996				1.95	605.1678	606.29
1997				2.02	581.2042	582.32
1998				1.96	593.1904	594.3127
1999				1.97	615.1901	616.3185
2000				2.04	591.2264	592.3466

2001				1.93	578.2682	579.3848
2002						
2003						
2004						
2005						
2006				2.47	475.2511	476.2856

2007				2.36	403.1936	404.2317
2008				2.42	427.1936	428.2387
2009				2.43	437.1546	438.2044
2010				2.39	433.15	434.1996
2011				2.39	445.1842	446.226

2012				/	455,1452	456,196
2013				2.41	433,15	434,1984
2014				2.42	443,1111	444,1632
2015				2.47	443,1111	444,1649
2016				2.53	477,0721	478,137



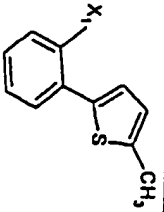
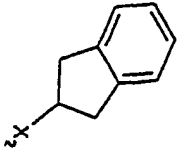

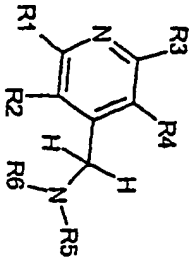

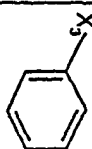

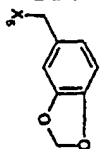

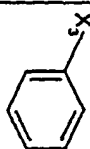

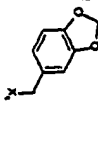
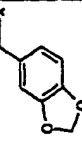

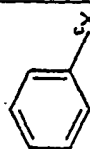

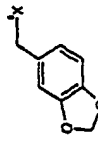
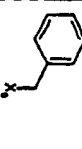
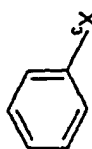

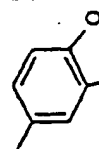
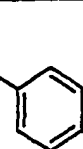


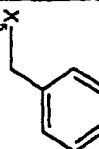
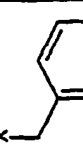
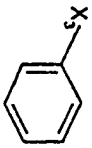

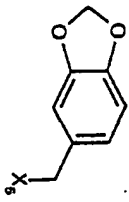
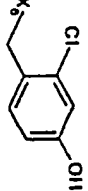
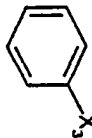
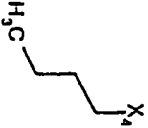
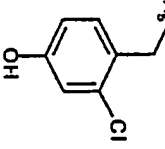
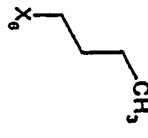
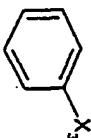
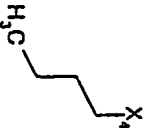
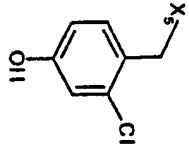
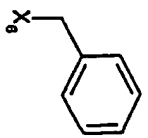
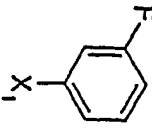


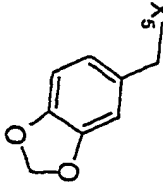
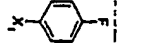

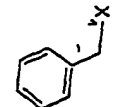
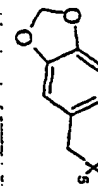


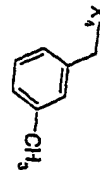
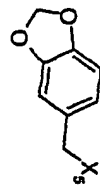


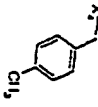
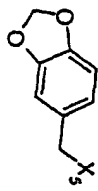
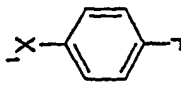

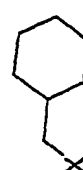
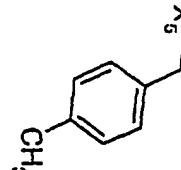


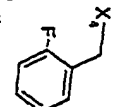
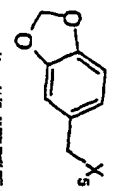
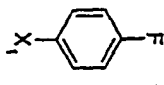

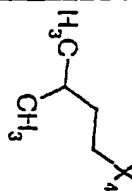
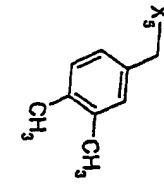
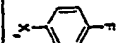

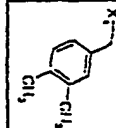
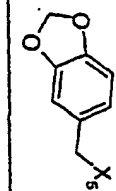
2017						
				2.41	423.1657	424.2055

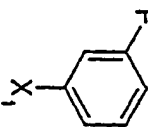

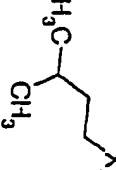
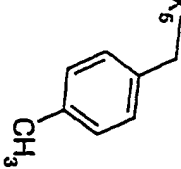
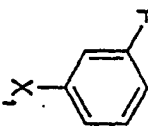


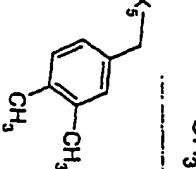
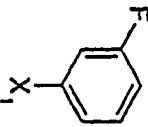


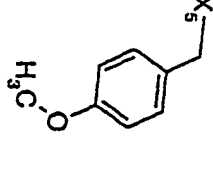
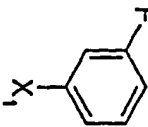
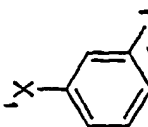

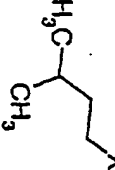
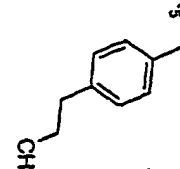
TABLE G		R1 or R1 and R2		R3	R4	R5	R6	Rtn. time	Comp. Mass	H <sup>+</sup> + Ion Obs.
		R1 or R1 and R2		R3	R4	R5	R6	Rtn. time	Comp. Mass	H <sup>+</sup> + Ion Obs.
1824								1.91	424.2151	425.2364
1825								2.17	558.2518	559.2742
1826								2.2	514.262	515.286
1827								2.09	508.2362	509.2629
1828								2.1	464.2464	465.2729

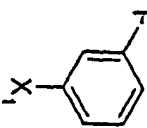

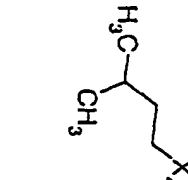
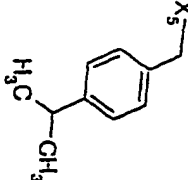
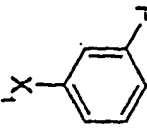

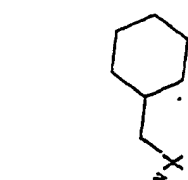
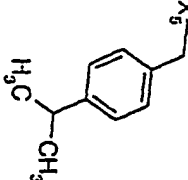
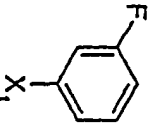

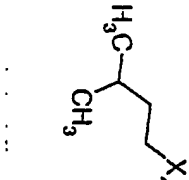
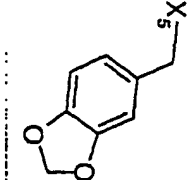
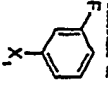

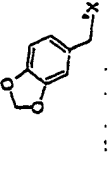
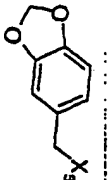
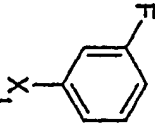


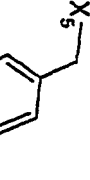
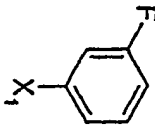

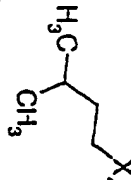
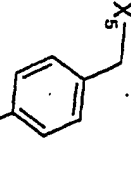
1829					2.04	514.2023	515.2661
1830					1.98	436.2281	437.2896
1831					2.05	470.2125	471.2745

727						2.04	491.2948	492.3288
728						2.08	493.3105	494.3472
729						2.06	465.2791	466.3023
730						2.08	465.2791	466.3028
731						1.99	477.2791	478.3062
732						2.07	477.2791	478.3031

733						2.04	479.2948	480.323
734						1.99	471.2322	472.2518
735						2.03	485.2479	486.2677
736						2.05	485.2479	486.2654
737						2.12	447.305	448.3199
738						1.99	489.2228	490.2399
739								
740						2.05	499.2635	500.2832

741						2.14	461.3206	462.3372
742						2.04	499.2635	500.2898
743						1.9	451.2635	452.2902
744						1.96	515.222	516.245
745						2.06	477.2791	478.3002
746						2.03	517.2199	518.246
747						2.08	433.2893	434.3055

748						1.96	421.2893	422.306
749						2.11	447.305	448.3214
750						1.99	435.305	436.3263
751						2.05	463.2999	464.3266
752						2.05	449.3206	450.3442

753						2.04	449.3206	450.3435
754						2.18	475.3363	476.3594
755						1.91	451.2635	452.2869
756						1.97	515.222	516.2496
757						2.06	477.2791	478.3031
758						1.99	453.2614	454.2874



769						2.02	517.2199	518.2543
760						2.1	463.3963	464.3699
761						2.03	467.277	468.306
762						1.98	531.2534	532.2854
763						1.97	531.2534	532.2903
764						1.93	531.2534	532.285

765					2.06	539.1542	540.1926
766					2.04	548.1427	550.1876
767					2.04	549.1427	550.1861
768					2.03	549.1427	550.1867
769					2.13	575.2948	576.329
770							
771							

772									
773						2.02	465.3144	466.3379	
774						2.01	465.3144	466.3359	
775						2.06	465.3144	466.3358	
776						1.99	525.2039	526.2423	
777						1.99	525.2039	526.2429	

778						1.93	545.269	546.3107
779								536.3018
780						2.07	535.2635	536.3018
781						2.09	555.2356	556.2706
782						1.97	531.2534	532.2892

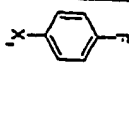
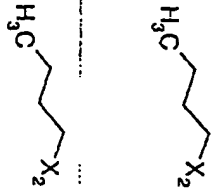
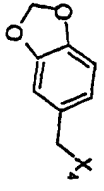
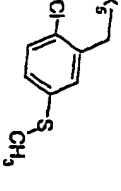
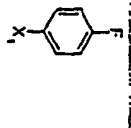
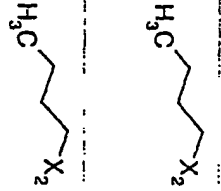
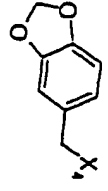
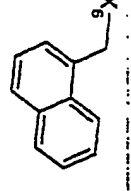
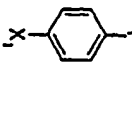
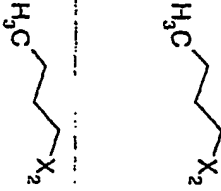
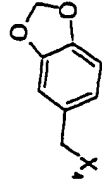
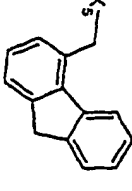
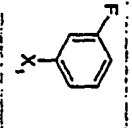
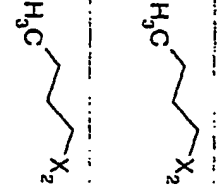
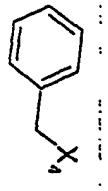
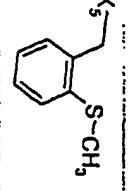
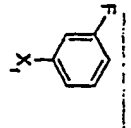
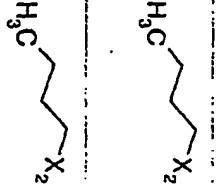
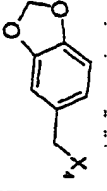
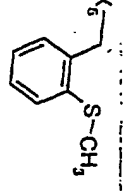
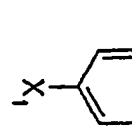
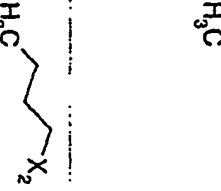
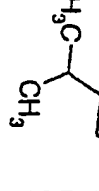
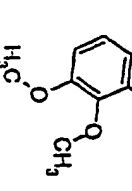
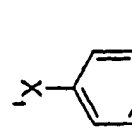
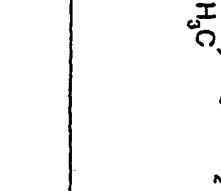

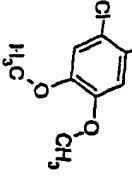
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784						2	471.2453	472.2802
785						2	523.321	524.354
786						2.03	499.2635	500.2993
787						1.98	515.2584	516.2964

788					1.98	515.2584	516.2967
789					2.03	519.2089	520.2536
790					1.99	515.2584	516.2904
791					1.98	515.2584	516.3315
792					2.06	611.1445	612.2336
793					2.05	563.1584	564.26

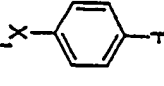

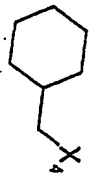
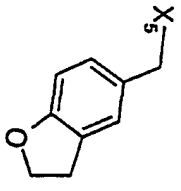


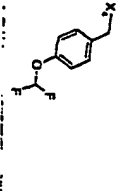
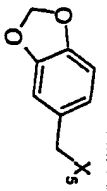
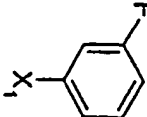
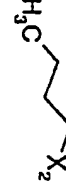
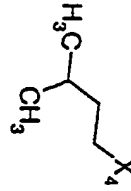
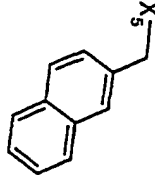
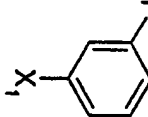

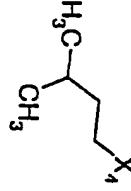
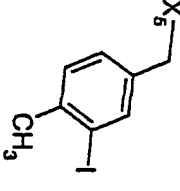
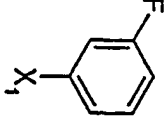


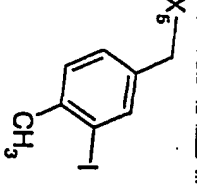
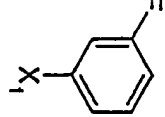

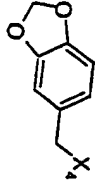
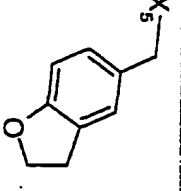
794						2.03	531.2356	532.3217
795						2.06	611.1445	612.2438
796						2.02	531.2356	532.3212
797						2.03	561.245	562.3306
798						1.74	436.3002	437.306

799					1.88	462.3159	463.4108
800					1.87	462.3159	463.4136
801					1.97	507.2133	508.3045
802					2.01	517.2199	518.3113
803					2.02	555.2145	556.3143
804					2.02	667.2281	668.3466
805					2.06	563.1504	564.27



806						2.06	551.181	552.2875
807						2.03	521.2479	522.3456
808						2.09	559.2635	560.3663
809						2.03	473.2301	474.313
810						2.02	517.2199	518.3132
811						2.01	501.2558	502.358
812						2.09	527.2715	528.3815

813						2.05	521.2479	522.3471
814								
815						2.09	455.2504	456.3523
816						2.07	519.2089	520.3145
817						1.05	449.2842	450.3776
818						1.95	513.2428	514.3442

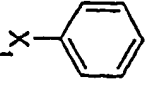
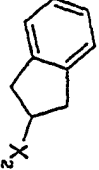
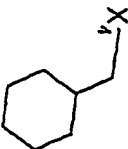
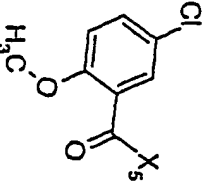
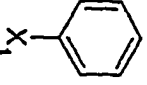
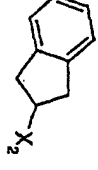
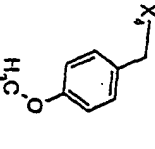
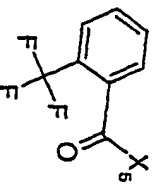
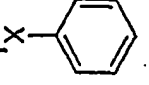
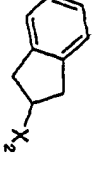
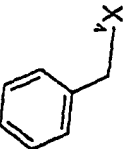
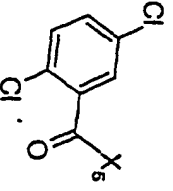
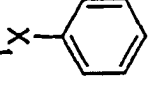
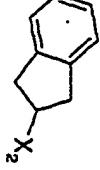
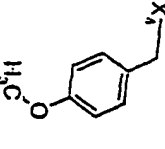
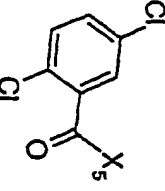
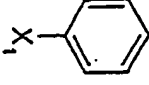
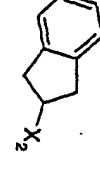
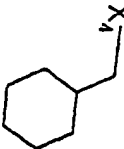
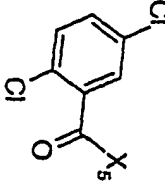
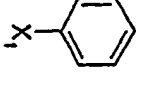
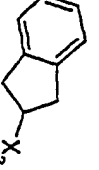
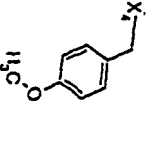
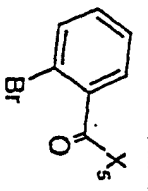
819						2.04	475.2999	476.4023
820						1.98	537.2239	538.3297
821						2.04	457.2893	458.3844
822								
823								
824						1.96	513.2428	514.345

825					2.04	475.2999	476.3996
826					1.97	473.2654	474.3578
827					2.08	499.281	500.3929
828							
829					2.08	577.274	578.3961

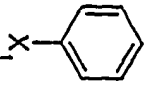
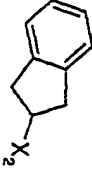
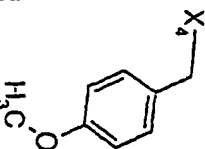
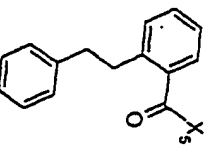
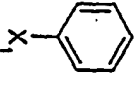
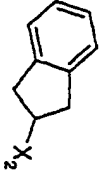
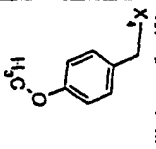
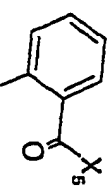
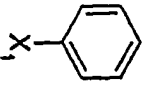
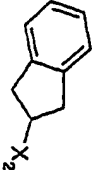
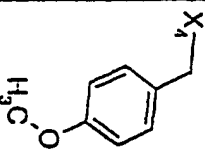
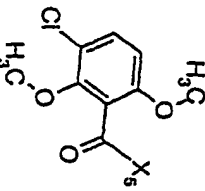
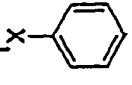
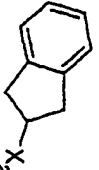
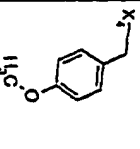
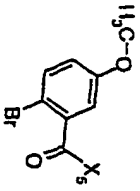
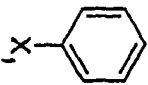
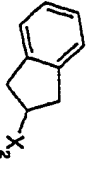
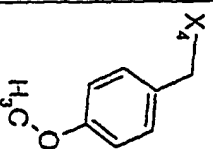
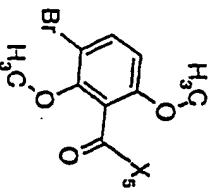
830						2	503.2384	504.3399
831						1.99	515.2584	516.3593
832						2.03	529.274	530.3805
833						2.03	563.1504	564.2842
834						1.98	545.269	546.3808
835						1.97	545.269	546.374

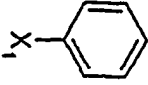
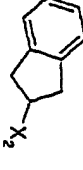
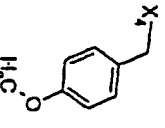
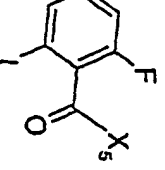
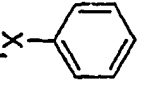
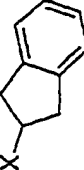
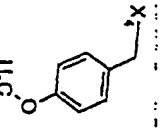
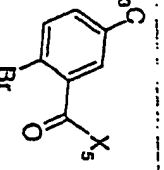
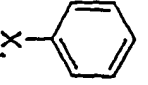
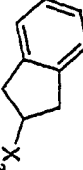
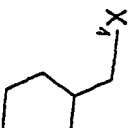
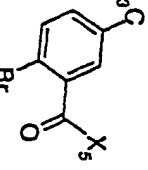
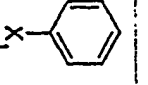
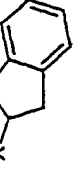
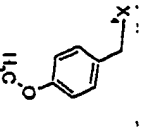
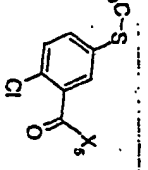
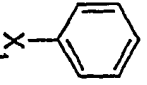
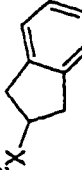
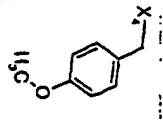
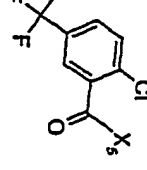
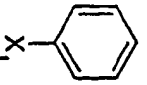
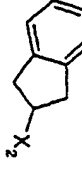
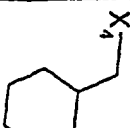
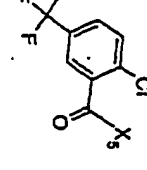
836						1.98	545.269	546.3859
837						1.92	545.269	546.3798
838						1.96	559.2846	560.3983
839						2.05	535.2635	536.3757
840						2.04	592.285	593.4103
841								

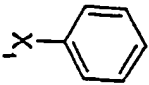
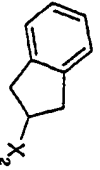
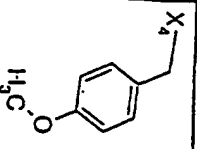
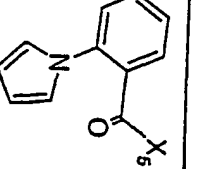
842					2.01	544,2308	545,3511
843					1.88	547,2026	548,3105
844					1.9	549,2228	550,3254
845					1.97	525,2592	526,3528
846					1.94	577,2132	578,3243

847						2.01	553.2496	554.3531
848						1.92	581.229	582.3329
849						1.95	551.1531	552.2697
850						1.95	581.1637	582.2848
851						2.03	557.2001	558.311
852						1.9	591.1522	592.27



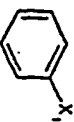

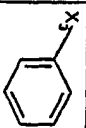
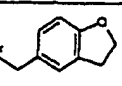
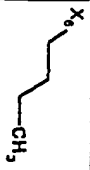
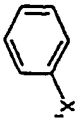

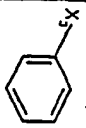
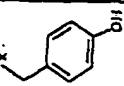
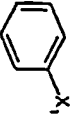

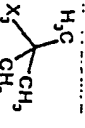
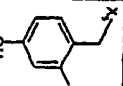
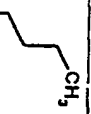
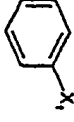
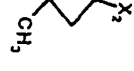
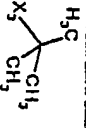
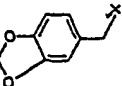
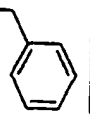
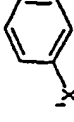

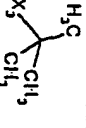
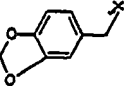
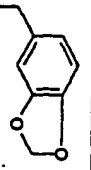
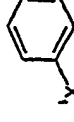
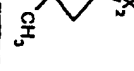
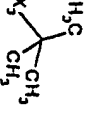
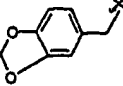
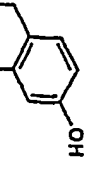
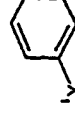
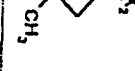
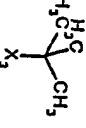
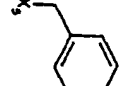
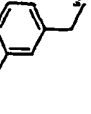
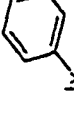

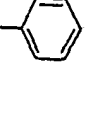
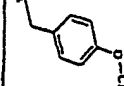
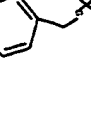
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857						1.96	651.1733	652.31

858						1.93	657.1288	650.2678
859						1.95	605.1678	606.29
860						2.02	581.2042	582.32
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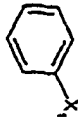

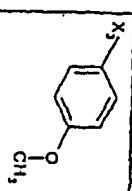
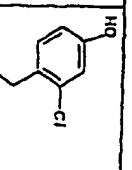
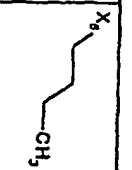
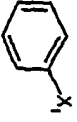

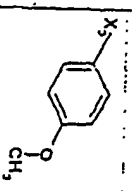
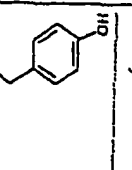
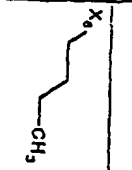
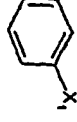

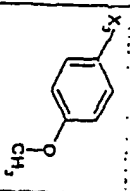
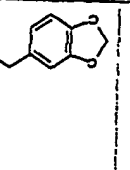
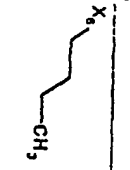
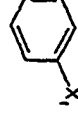

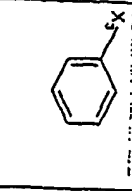
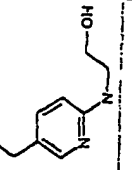
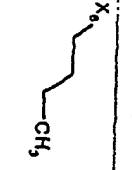
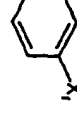

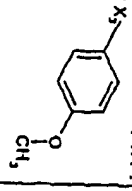
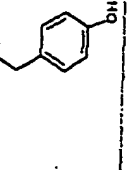
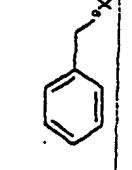
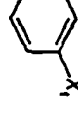

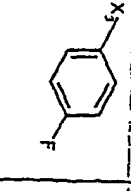
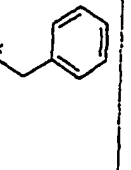
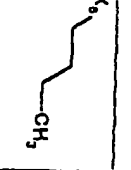
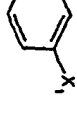

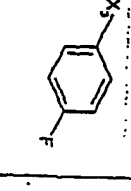
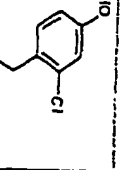
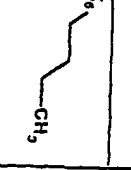
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906							2.02	501.2547	602.3203
907							2.05	535.239	536.3062
908							1.95	495.2886	496.338
909							1.95	509.3042	510.349
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911							2.06	529.2729	530.3288
912							2.06	627.2936	628.3539

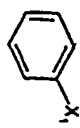
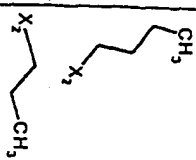
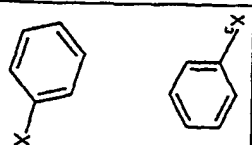
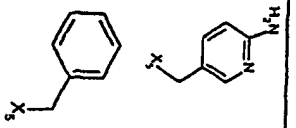
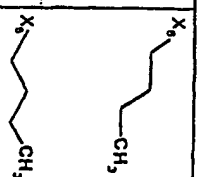
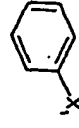
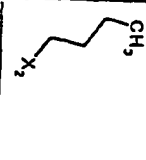
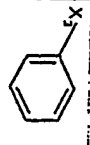
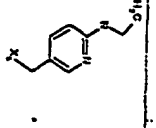
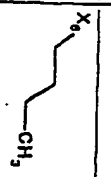
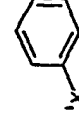
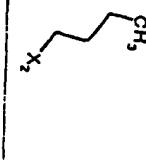
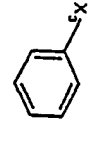
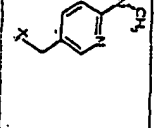
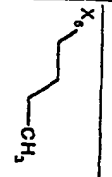
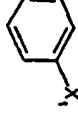
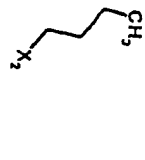
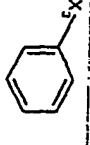
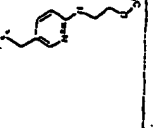
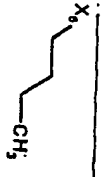
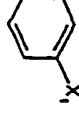
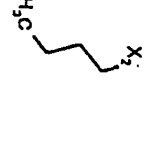
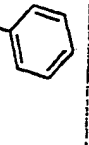
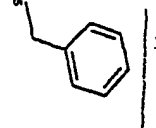
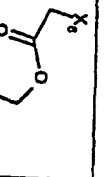
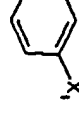
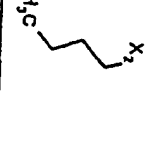
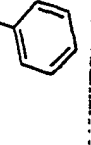
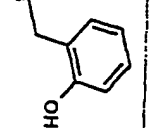
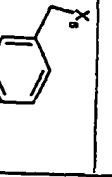




913							1.91	493.3093	494.3662
914							1.98	501.278	502.3292
915							2.04	481.286	482.3375
916							2.06	509.3042	510.3504
917							2.04	553.2941	554.3566
918							2.01	559.2602	560.3214
919							1.98	559.2602	560.3226
920							2.07	515.2936	516.3561

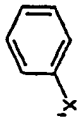
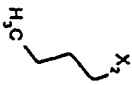
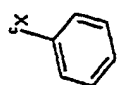
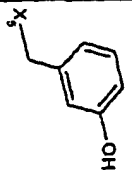
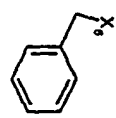
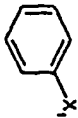
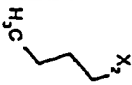
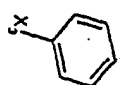
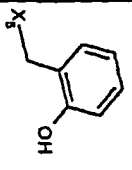
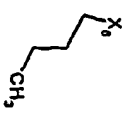
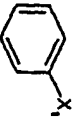

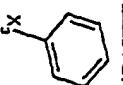
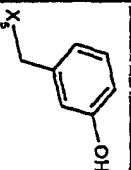
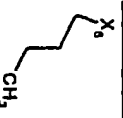
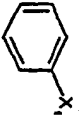

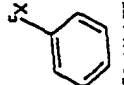
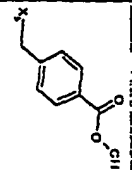
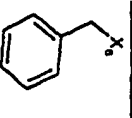
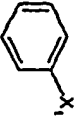

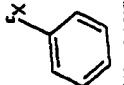
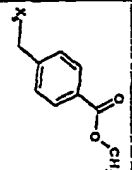
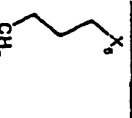
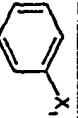

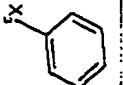
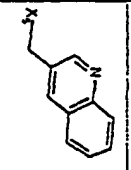
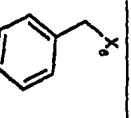
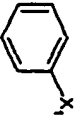

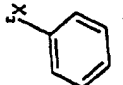
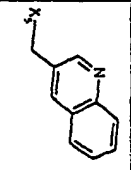
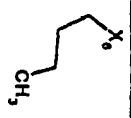
921					1.8	467.2937	468.3449
922					1.97	486.255	487.3133
923					1.96	520.2394	521.3087
924					1.77	521.3519	522.4169
925					1.79	555.3362	556.421
926					2.06	565.2496	566.3239
927					1.76	545.3155	546.3049

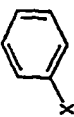

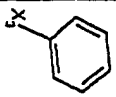
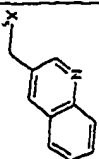
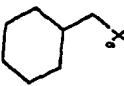
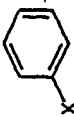

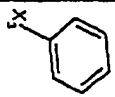
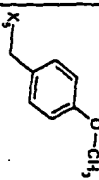

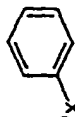
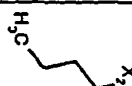
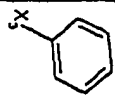
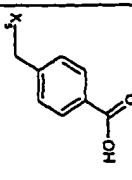
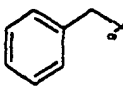
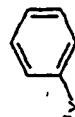
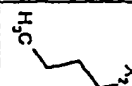
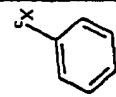
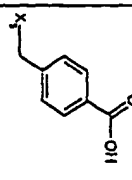

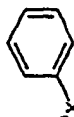
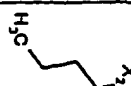
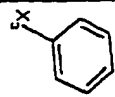
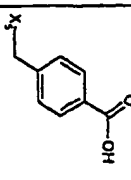
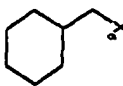
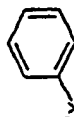
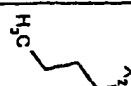
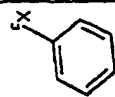
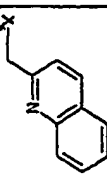
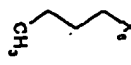
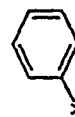
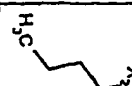
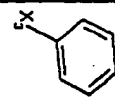
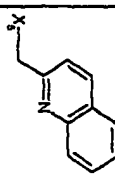
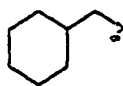
928						2.02	531.2653	532.3318
929						1.79	497.3042	498.3625
930						1.95	525.2991	526.3686
931						1.74	511.3311	512.3882
932						2	531.2886	532.3475
933						2	469.2893	470.3573
934						2.03	519.2452	520.3179



935							2.05	653.2296	654.3043
936							1.97	513.2792	514.3508
937							2.06	547.2635	548.3326
938							1.71	483.2886	484.3469
939							1.86	423.2675	424.3207
940							1.94	458.2504	459.2958
941							1.93	492.2348	493.2848

942						1.74	467.3049	468.3629
943						1.92	437.2831	438.2847
944						1.77	485.3362	498.4057
945						1.74	481.3206	482.3854
946						1.76	525.3467	528.4145
947						1.98	481.2729	482.3188
948						2.01	501.278	502.3374

949							1.99	501.278	502.3323
950							1.88	467.2937	468.3544
951							1.88	467.2937	468.352
952							2.04	543.2886	544.3618
953							2.03	509.3042	510.364
954							1.93	536.294	537.3635
955							1.94	502.3097	503.3694

956							2.05	542.3409	543.4108
957							1.92	481.3093	482.3674
958							1.99	529.2729	530.3309
959							1.97	495.2886	496.3324
960							2.08	535.3199	536.3663
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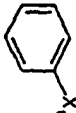

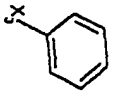
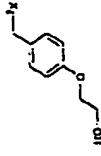
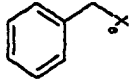
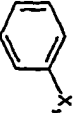

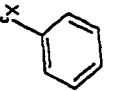
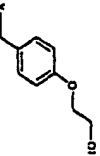
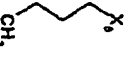
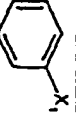

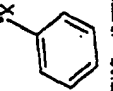
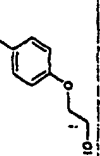
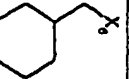
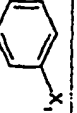

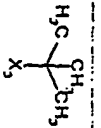
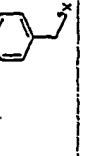
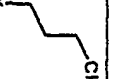
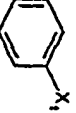

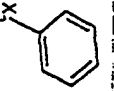
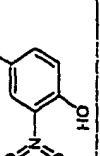
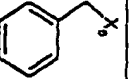
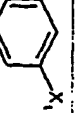

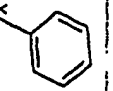
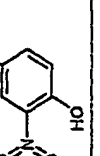
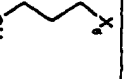
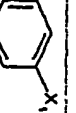

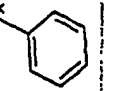
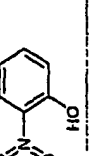
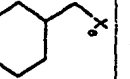
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964						1.77	529.3206	530.373
965								
966						1.94	528.3253	529.3721
967						1.88	494.3409	495.3921
968						2.05	534.3723	535.431
969						1.77	491.3049	492.3542

970							2.03	568.2661	569.3215
971							1.98	534.2817	535.3365
972							2.14	574.313	575.38
973							1.94	542.3046	543.3302
974							1.89	508.3202	509.3457
975							1.91	522.3359	523.3574
976							2.03	562.3672	563.3868

977							1.99	515.2936	516.3203
978							1.86	481.3093	482.3423
979							2.05	521.3406	522.3715
980							2.06	515.2936	516.3033
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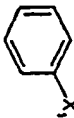
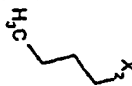
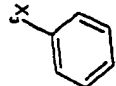
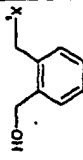
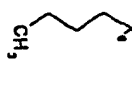
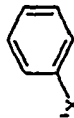

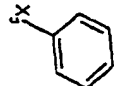
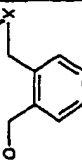
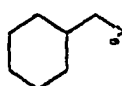
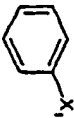
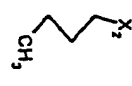
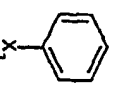


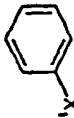

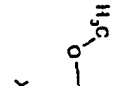
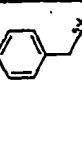
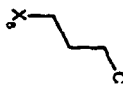
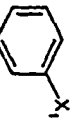

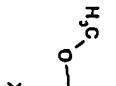
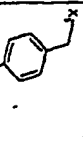

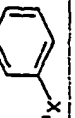

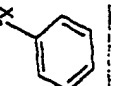
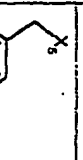






984							1.99	481.3093	482.3264	
985								2.15	521.3406	522.3597
986								2.03	489.3355	490.3545
987								1.93	461.3406	462.3651
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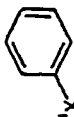
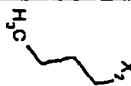
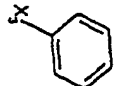
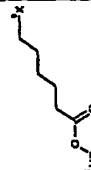
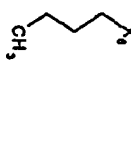
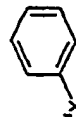
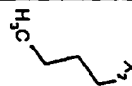
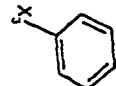
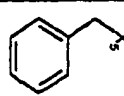
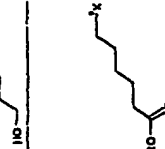
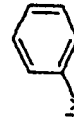
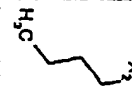
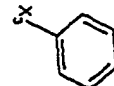
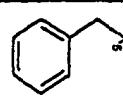
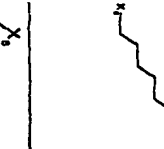
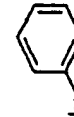
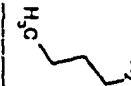
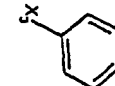

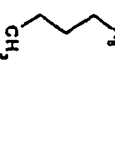
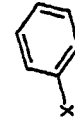

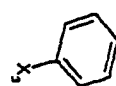
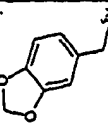
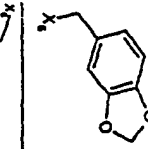
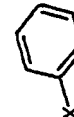

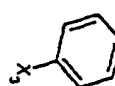
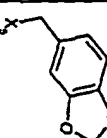
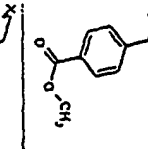
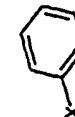
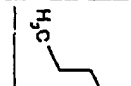
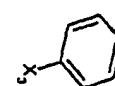
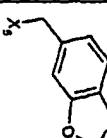
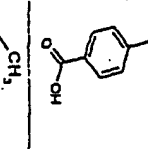

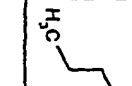
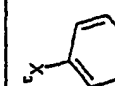
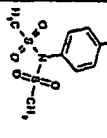



991							1.98	545.3042	546.332
992							1.82	511.3199	512.3492
993							2.05	551.3512	552.3806
994							1.91	488.3515	489.3748
995							2.02	546.2631	547.2886
996							2	512.2787	513.3031
997							2.11	552.3101	553.335

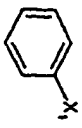

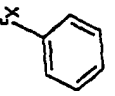
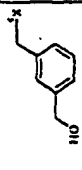
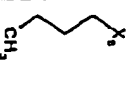
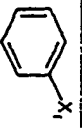

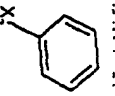
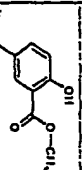
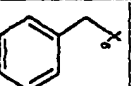
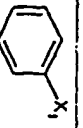

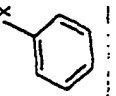
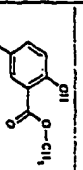
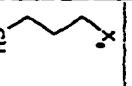
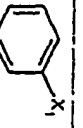

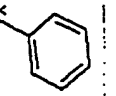
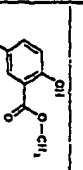
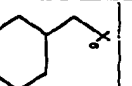
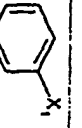

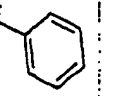
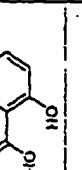
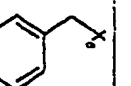
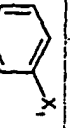

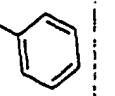
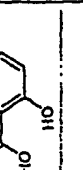
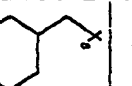
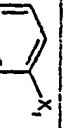

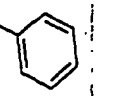
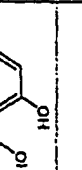
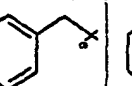
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999							2.03	612.2787	513.3018
1000							2.11	652.3101	563.3454
1001							2.06	578.4349	579.501
1002							2.14	618.4661	619.54
1003							1.71	552.3628	553.43
1004							1.92	592.4141	593.47

1005						1.9	474.3359	475.3617
1006						1.81	558.2995	559.3615
1007						1.78	460.3566	461.4005
1008						2.03	543.2888	544.3141
1009						1.95	509.3042	510.3276
1010						2.08	549.3355	550.3668
1011						1.96	515.2936	516.3184

1012							1.84	481.3093	482.3309
1013							1.98	521.3405	522.3765
1014							1.88	564.2559	565.3013
1015							1.87	530.2715	531.3078
1016							1.88	511.3199	512.3484
1017							1.98	547.301	548.3231
1018							1.98	523.3199	524.3481

1019							1.82	489.3355	490.3575
1020							1.9	509.3042	510.3283
1021							1.88	495.325	496.3488
1022							1.77	461.3406	462.3634
1023							2.03	573.2628	574.2927
1024							2.03	587.2784	588.3088
1025							1.96	573.2628	574.3035
1026									

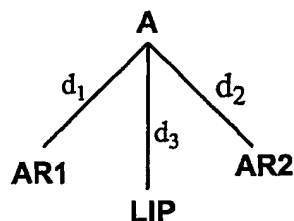
1027							1.85	544.2872	545.3313
1028							2.03	543.2886	544.3122
1029							2.03	509.3042	510.3173
1030							2.12	549.3355	550.3542
1031							1.98	529.2729	530.2999
1032							2.08	535.3199	536.3453
1033							1.97	515.2936	516.3203

1034							1.87	481.3093	482.3294
1035							2.06	559.2835	560.311
1036							2.03	525.2991	526.3195
1037							2.17	565.3304	566.35
1038									
1039							2.12	551.3148	552.3455
1040							1.93	531.2886	532.3281

**CLAIMS****What is claimed is:**

1. A carbon-containing compound
  - i) having a molecular mass of less than 700 amu;
  - ii) that is nonpeptidic and non-peptidomimetic;
  - iii) that exhibits C5a antagonist activity with an  $IC_{50}$  of less than 200 nM in an assay of C5a mediated chemotaxis or calcium mobilization; and
  - iv) that exhibits less than 10% agonist activity in a GTP binding assay.
2. A compound according to claim 1, which contains one or more heteroaryl rings.

3. A compound according to Claim 1 of the formula:



AR1 and AR2 are independently carbocyclic aryl or heteroaryl;

LIP represents an alkyl, cycloalkyl, carbocyclic aryl, heteroaryl, or arylalkyl;

A is oxygen or nitrogen;

$d_1$  represents the distance between A and the geometric center of AR1 and is between 3 and 6 angstroms in at least one energetically accessible conformer of the compound;

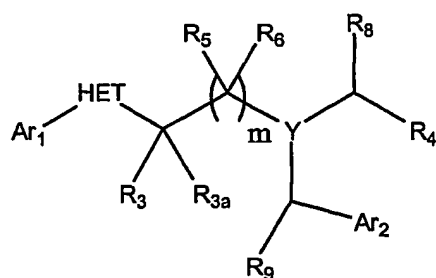
$d_2$  represents the distance between A and the geometric center of AR2 and is between 5 and 10 angstroms in at least one energetically accessible conformer of the compound; and

$d_3$  represents the distance between A and the nearest atom of LIP and is between 3 and 6 angstroms in at least one energetically accessible conformer of the compound.



4. A compound of claim 1, 2 or 3 that is an optionally substituted arylimidazole, an optionally substituted arylpyridyl, an optionally substituted aryl-substituted cycloalkylimidazole, an optionally substituted arylpyrazole, an optionally substituted benzimidazole, an optionally substituted aryl-substituted tetrahydroisoquinoline, or an optionally substituted biaryl carboxamide.

5. A compound of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof,

wherein:

the ring system represented by HET is any optionally substituted heterocycle

comprising a nitrogen or oxygen that can act as a hydrogen bond acceptor;

Y is N or CH;

m is 0, 1, or 2;

R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

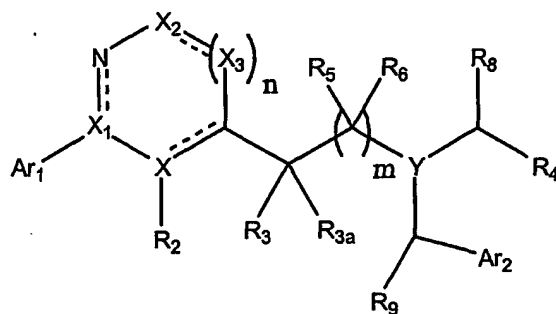
R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

$R_4$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

$Ar_1$  and  $Ar_2$  are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

$R_8$  and  $R_9$  are independently chosen from H or optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, (cycloalkyl)alkyl, haloalkyl, or the like.

6. A compound of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof,

wherein:

$m$  is 0, 1, or 2;

$n$  is 0 or 1,

$X$  and  $X_1$  are independently chosen from C and N,

$X_2$  is C- $R_1$  or N,

$X_3$  is C-R or N,

$R$  and  $R_1$  are independently chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl,

optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

$R_2$ ,  $R_3$ ,  $R_{3A}$ ,  $R_5$ , and  $R_6$  are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

when  $n$  is 0,  $R_1$  and  $R_3$  may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

when  $n$  is 1,  $R$  and  $R_3$  may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

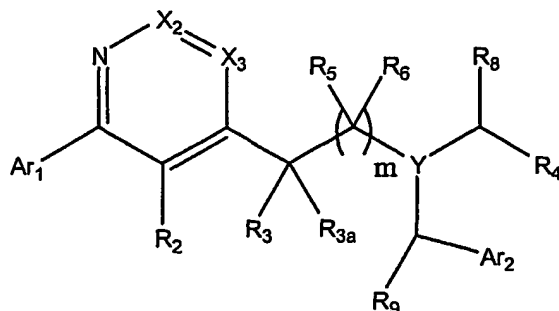
$R_4$  is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

$R_4$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

$Ar_1$  and  $Ar_2$  are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

$R_8$  and  $R_9$  are independently chosen from H or optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, (cycloalkyl)alkyl, haloalkyl, or the like.

7. A compound of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof,

wherein:

$m$  is 0, 1, or 2;

$X_2$  is C- $R_1$  or N,

$X_3$  is C-R or N,

R and  $R_1$  are independently chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl, optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

$R_2$ ,  $R_3$ ,  $R_{3A}$ ,  $R_5$ , and  $R_6$  are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

R and  $R_3$  may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

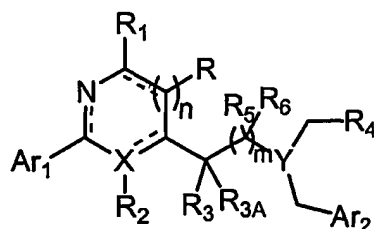
$R_4$  is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

$R_4$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

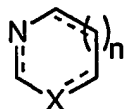
R<sub>8</sub> and R<sub>9</sub> are independently chosen from H or optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, (cycloalkyl)alkyl, haloalkyl, or the like.

8. A compound of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof,  
wherein:

the ring system represented by



is a 5 to 7 membered heterocycle that may be either aromatic or partially unsaturated;

X is N or C;

Y is N or CH;

n is 0, 1, or 2;

m is 0, 1, or 2;

R and R<sub>1</sub> are independently chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl,

optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

when n is 0, R<sub>1</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

when n is 1, R and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

9. A compound according to Claim 8, wherein

R and R<sub>1</sub> are independently selected from

i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and

ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino,

iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

R<sub>2</sub> is hydrogen, hydroxy, halogen, amino, cyano, nitro, or haloalkyl, or

R<sub>2</sub> is alkoxy, mono- or dialkylamino, alkyl, alkenyl, alkynyl or (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from

- i) hydrogen, halogen, hydroxy, amino, alkoxy, mono- or dialkylamino, cyano, nitro, haloalkyl, and
- ii) alkyl, alkenyl, alkynyl, cycloalkyl, and (cycloalkyl)alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or dialkylamino;

when n is 0, R<sub>1</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino;

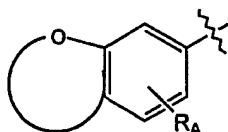
when n is 1, R and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, each of which may be unsubstituted or substituted with

one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino; or

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino; and

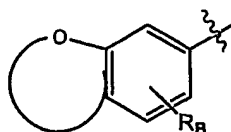
Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

i) phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny,



cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl, and

ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino.

10. A compound according to Claim 8, wherein

$R$  and  $R_1$  are independently selected from

- i) hydrogen, halogen, hydroxy, amino,  $C_1$ - $C_6$  alkoxy, mono- or di( $C_1$ - $C_6$ )alkylamino, cyano, nitro, haloalkyl, and
- ii)  $C_1$ - $C_8$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_3$ - $C_8$  cycloalkyl, and ( $C_3$ - $C_8$ )cycloalkyl)  $C_1$ - $C_3$  alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino,
- iii) phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,

C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

when n is 0, R<sub>1</sub> and R<sub>3</sub> may be joined to form a C<sub>3</sub>-C<sub>8</sub> cycloalkyl or C<sub>3</sub>-C<sub>8</sub>

heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

when n is 1, R and R<sub>3</sub> may be joined to form a C<sub>3</sub>-C<sub>8</sub> cycloalkyl or C<sub>3</sub>-C<sub>8</sub>

heterocycloalkyl ring, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is hydrogen, hydroxy, halogen, amino, cyano, nitro, or haloalkyl,

R<sub>2</sub> is alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>; and R<sub>6</sub> are independently selected from

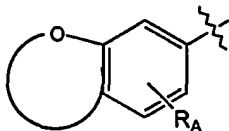
- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with

one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:

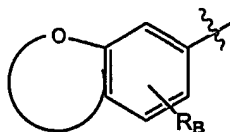


wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl,

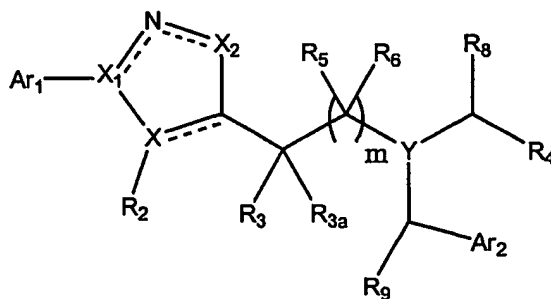
naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidy; and

ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

11. A compound according to Claim 8 of the formula:



wherein:

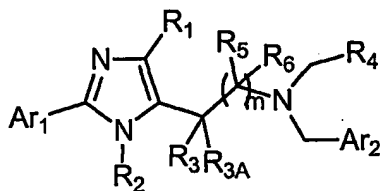
X and X<sub>1</sub> are independently chosen from C and N;

X<sub>2</sub> is C-R<sub>1</sub> or N;

m, Ar<sub>1</sub>, Ar<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>4</sub>, R<sub>5</sub>, and R<sub>6</sub> are as defined in Claim 8;

R<sub>8</sub> and R<sub>9</sub> are independently chosen from H or optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, (cycloalkyl)alkyl, haloalkyl, or the like.

12. A compound of the formula:



wherein:

m is 0, 1, or 2;

R<sub>1</sub> is chosen from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted (cycloalkyl)alkyl, optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms;

R<sub>2</sub> is chosen from optionally substituted C<sub>1</sub>-C<sub>8</sub> alkyl, optionally substituted C<sub>3</sub>-C<sub>8</sub> cycloalkyl, optionally substituted C<sub>3</sub>-C<sub>8</sub> cycloalkyl(C<sub>1</sub>-C<sub>8</sub>)alkyl, optionally substituted C<sub>2</sub>-C<sub>8</sub> alkenyl, optionally substituted C<sub>2</sub>-C<sub>8</sub> alkynyl, haloalkyl, aminoalkyl, each of which may be unsubstituted or preferably substituted with one or more substituents selected from oxo (e.g. carbonyl), hydroxy, alkoxy, amide, ester, cyano, acetoxy or nitro.

R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, and R<sub>6</sub> are independently selected from hydrogen, hydroxy, halogen, amino, cyano, nitro, haloalkyl, alkoxy, mono- or dialkylamino, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, and optionally substituted (cycloalkyl)alkyl;

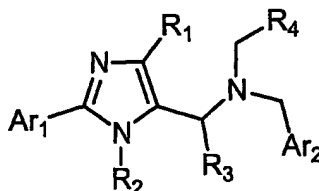
R<sub>1</sub> and R<sub>3</sub> may be joined to form a cycloalkyl or heterocycloalkyl ring, each of which may be optionally substituted;

R<sub>4</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl each of which may be optionally substituted; or

R<sub>4</sub> is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms; and

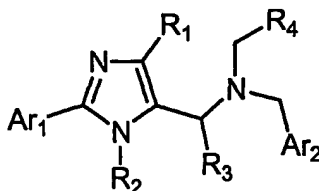
Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 heteroatoms.

13. A compound according to Claim 12 of the formula:



wherein m, Ar<sub>1</sub>, Ar<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are as defined in Claim 12.

14. A compound according to Claim 12 of the formula:



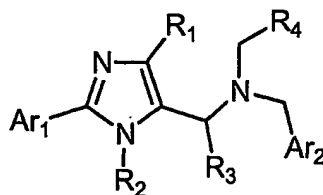
wherein:

R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl.

15. A compound according to Claim 12 of the formula:



wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, thienyl, imidazolyl, pyridyl, pyrimidyl, benzodioxinyl, benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 12;

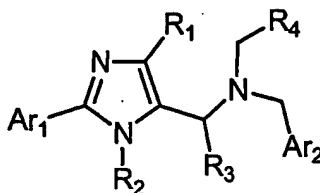
R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

16. A compound according to Claim 12 of the formula:



wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, thienyl, imidazolyl, pyridyl, pyrimidyl, benzodioxinyl, benzodioxolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 12;

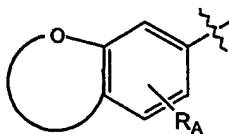
R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>7</sub> alkyl, halogen or phenyl optionally substituted with C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or C<sub>1</sub>-C<sub>7</sub> alkyl; and

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, cinnolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

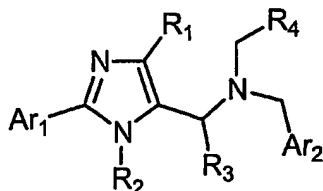
R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.



17. A compound according to Claim 12 of the formula:



wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 12;

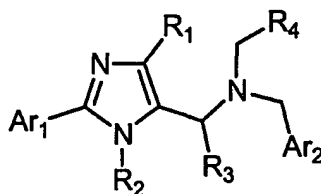
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

18. A compound according to Claim 12 of the formula:



wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is defined as in Claim 12;

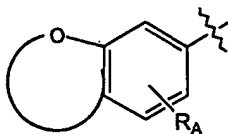
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

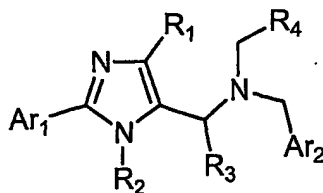
R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or quinoxalinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

19. A compound according to Claim 12 of the formula:

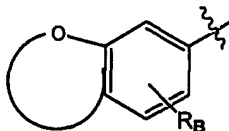


wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; or

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

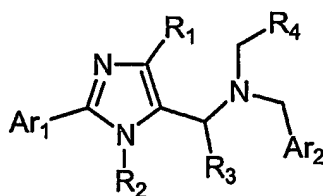
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

20. A compound according to Claim 12 of the formula:

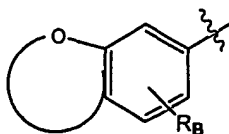


wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is chosen from phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, and quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; or

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

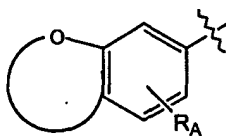
R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl; and

R<sub>3</sub> is hydrogen or methyl; and

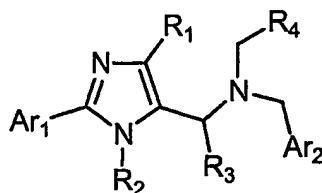
R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

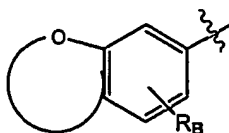
21. A compound according to Claim 12 of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

Ar<sub>1</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, or pyridyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is a bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>1</sub> is selected from

- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub>)cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>1</sub> is selected from

phenyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl,

pyrazinyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

R<sub>2</sub> and R<sub>3</sub> are independently selected from

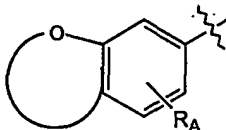
- i) hydrogen, halogen, hydroxy, amino, C<sub>1</sub>-C<sub>6</sub> alkoxy, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, cyano, nitro, haloalkyl, and
- ii) C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, and (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted by one or more of halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy,

amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, and 1-piperidyl; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

22. A compound according to Claim 21, wherein the compound exhibits an IC<sub>50</sub> of 1μM or less in an assay of C5a mediated chemotaxis or calcium mobilization.

23. A compound according to Claim 21, wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

24. A compound according to Claim 21, wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and



R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl) C<sub>1</sub>-C<sub>3</sub> alkyl, each of which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

25. A compound according to Claim 21, wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is phenyl, phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, thienyl, pyridyl, pyrimidyl, pyrazinyl, naphthyl, indolyl, indanyl, benzo[b]thiophenyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

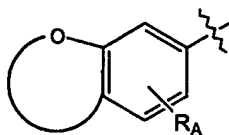
26. A compound according to Claim 21, wherein:

R<sub>1</sub> is hydrogen, methyl, ethyl, or phenyl;

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

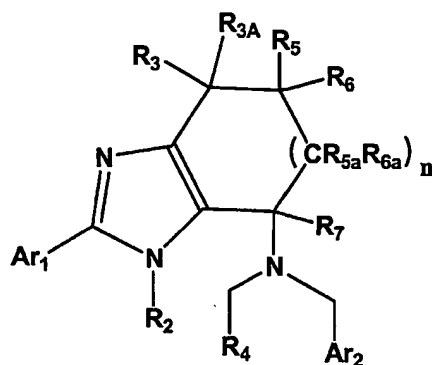
R<sub>3</sub> is hydrogen or methyl; and

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino.

27. A compound of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

$n$  is an integer from 0 to 3; and

$R_2$  is chosen from optionally substituted  $C_1$ - $C_8$  alkyl, optionally substituted  $C_3$ - $C_8$  cycloalkyl, optionally substituted  $C_3$ - $C_8$  cycloalkyl( $C_1$ - $C_8$ )alkyl, optionally substituted  $C_2$ - $C_8$  alkenyl, optionally substituted  $C_2$ - $C_8$  alkynyl, haloalkyl, aminoalkyl, each of which may be unsubstituted or preferably substituted with one or more substituents selected from oxo (e.g. carbonyl), hydroxy, alkoxy, amide, ester, cyano, acetoxy or nitro.

$R_4$  is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be substituted or unsubstituted; or

$R_4$  is optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaromatic or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms,

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or alkyl; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a cycloalkyl ring;

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy, alkyl, and alkoxy;

R<sub>7</sub> represents hydrogen or alkyl;

Ar<sub>1</sub> is ethylenedioxyphenyl, methylenedioxyphenyl, or;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently optionally substituted carbocyclic aryl, optionally substituted arylalkyl, or an optionally substituted heteroaryl or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

28. A compound according to Claim 27, wherein:

n, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>5a</sub>, R<sub>6a</sub>, and R<sub>7</sub> are defined as in Claim 27, and

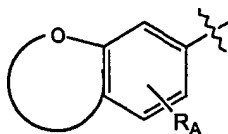
R<sub>4</sub> is hydrogen or

alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino and mono- or dialkylamino,

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids,

aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl and - $X_4R_B$ , wherein  $X_4$  and  $R_B$  are as defined below; or

$R_4$  is a bicyclic oxygen-containing group of the formula:



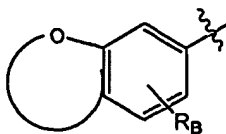
wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

$Ar_1$  is ethylenedioxyphenyl, methylenedioxyphenyl, or;

$Ar_1$  and  $Ar_2$  are independently chosen from

- i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, mono- or dialkylamino, aminoalkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl and - $X_4R_B$ , wherein  $X_4$  and  $R_B$  are as defined below; and

- ii) bicyclic oxygen-containing groups of the formula:



wherein  $R_B$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, alkyl, alkenyl, alkynyl, alkoxy, amino, and mono- or dialkylamino;

$X_4$  is independently selected at each occurrence from the group consisting of  $-\text{CH}_2-$ ,  $-\text{CHRC}-$ ,  $-\text{O}-$ ,  $-\text{S(O)}_m-$ ,  $-\text{NH}-$ ,  $-\text{NR}_C-$ ,  $-\text{C(=O)NH}-$ ,  $-\text{C(=O)NR}_C-$ ,  $-\text{S(O)}_m\text{NH}-$ ,  $-\text{S(O)}_m\text{NR}_C-$ ,  $-\text{NHC(=O)}-$ ,  $-\text{NR}_C\text{C(=O)}-$ ,  $-\text{NHS(O)}_m-$ ,  $-\text{C(=O)NHS(O)}_m-$ , and  $-\text{NR}_C\text{S(O)}_m-$  (where  $m$  is 0, 1, or 2); and

$R_B$  and  $R_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-\text{O(alkyl)}$ ,  $-\text{NH(alkyl)}$ ,  $-\text{N(alkyl)(alkyl)}$ ,  $-\text{NHC(O)(alkyl)}$ ,  $-\text{N(alkyl)C(O)(alkyl)}$ ,  $-\text{NHS(O)}_x\text{(alkyl)}$ ,  $-\text{S(O)}_x\text{(alkyl)}$ ,  $-\text{S(O)}_x\text{NH(alkyl)}$ ,  $-\text{S(O)}_x\text{N(alkyl)(alkyl)}$ , (where  $x$  is 0, 1, or 2).

29. A compound according to Claim 27, wherein:

$n$  and  $R_2$  are defined as in Claim 27, and

$R_3$  and  $R_{3A}$  are the same or different and represent hydrogen or  $\text{C}_1\text{-C}_6$  alkyl; or

$R_3$  and  $R_{3A}$ , taken together with the carbon atom to which they are attached, form a  $\text{C}_{3-8}$  cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy,  $\text{C}_1\text{-C}_6$  alkyl, or  $\text{C}_1\text{-C}_6$  alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached form a  $\text{C}_{3-8}$  cycloalkyl ring;

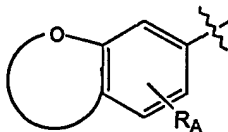
$R_{5a}$  and  $R_{6b}$  are the same or different, and are independently selected at each occurrence from hydrogen, halogen, hydroxy,  $\text{C}_1\text{-C}_6$  alkyl, and  $\text{C}_1\text{-C}_6$  alkoxy;

$R_4$  is hydrogen or

C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub>cycloalkyl, (C<sub>3-8</sub> cycloalkyl)C<sub>1-4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-C<sub>6</sub></sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-C<sub>6</sub></sub> alkoxy, amino and mono- or di(C<sub>1-C<sub>6</sub></sub>)alkylamino,

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-C<sub>6</sub></sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-C<sub>6</sub></sub> alkoxy, amino, mono- or di(C<sub>1-C<sub>6</sub></sub>)alkylamino, amino(C<sub>1-C<sub>6</sub></sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1-C<sub>6</sub></sub>)alkylaminocarbonyl, N-(C<sub>1-C<sub>6</sub></sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, -X<sub>4</sub>R<sub>B</sub>, wherein X<sub>4</sub> and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:



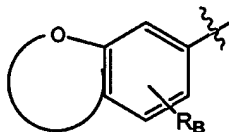
wherein R<sub>A</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1-C<sub>6</sub></sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-C<sub>6</sub></sub> alkoxy, amino, and mono- or di(C<sub>1-C<sub>6</sub></sub>)alkylamino;

Ar<sub>1</sub> is ethylenedioxyphenyl, methylenedioxyphenyl;

Ar<sub>1</sub> and Ar<sub>2</sub> are independently chosen from

i) phenyl, phenylalkyl, chromanyl, pyrrolyl, furanyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyrazinyl, benzimidazolyl, naphthyl, indolyl, indanyl, isoindolyl, benzofuranyl, isobenzofuranyl, benzo[b]thiophenyl, benzodioxanyl, benzodioxinyl, benzodioxolyl, benz[d]isoxazolyl, quinoliny, isoquinoliny, cinnoliny, quinazoliny, or quinoxaliny, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and -X<sub>4</sub>R<sub>B</sub>, wherein X<sub>4</sub> and R<sub>B</sub> are as defined below; and

ii) bicyclic oxygen-containing groups of the formula:



wherein R<sub>B</sub> represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

X<sub>4</sub> is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -CHR<sub>C</sub>-, -O-, -S(O)<sub>m</sub>-, -NH-, -NR<sub>C</sub>-, -C(=O)NH-, -C(=O)NR<sub>C</sub>-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NR<sub>C</sub>-, -NHC(=O)-, -NR<sub>C</sub>C(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NR<sub>C</sub>S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or

substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-O(C_1-C_6 \text{ alkyl})$ ,  $-NH(C_1-C_6 \text{ alkyl})$ ,  
 $-N(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ ,  $-NHC(O)(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})C(O)(C_1-C_6 \text{ alkyl})$ ,  $-NHS(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xNH(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xN(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ , (where x is 0, 1, or 2).

30. A compound according to Claim 27, wherein

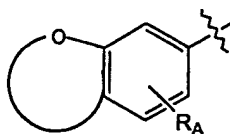
n, R<sub>2</sub>, R<sub>3</sub>, R<sub>3A</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>5a</sub>, R<sub>6a</sub>, and R<sub>7</sub> are as defined in Claim 27,

R<sub>4</sub> is hydrogen or

C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>4</sub>alkyl, haloalkyl, each or which may be unsubstituted or substituted with one or more substituents selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino and mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino,

R<sub>4</sub> is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl,  $-X_4R_B$ , wherein X<sub>4</sub> and R<sub>B</sub> are as defined below; or

R<sub>4</sub> is a bicyclic oxygen-containing group of the formula:





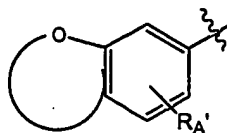
wherein  $R_A$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$Ar_1$  is phenyl, ethylenedioxyphenyl, methylenedioxyphenyl, thienyl, or pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which is unsubstituted or substituted with up to four substituents independently selected from:

halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl, N-( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and  $-X_4R_B$ , wherein  $X_4$  and  $R_B$  are as defined below;

$Ar_2$  is phenyl, naphthyl, thienyl, pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which may be optionally substituted or substituted with up to four groups independently selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, amino( $C_1$ - $C_6$ )alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di( $C_1$ - $C_6$ )alkylaminocarbonyl, N-( $C_1$ - $C_6$ )alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and  $-X_4R_B$ , wherein  $X_4$  and  $R_B$  are as defined below; or

$Ar_2$  is a bicyclic oxygen-containing group of the formula:



wherein  $R_A'$  represents 0 to 3 groups selected from halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, and mono- or di( $C_1$ - $C_6$ )alkylamino;

$X_4$  is independently selected at each occurrence from the group consisting of  $-CH_2-$ ,  $-CHRC-$ ,  $-O-$ ,  $-S(O)_m-$ ,  $-NH-$ ,  $-NR_C-$ ,  $-C(=O)NH-$ ,  $-C(=O)NR_C-$ ,  $-S(O)_mNH-$ ,  $-S(O)_mNR_C-$ ,  $-NHC(=O)-$ ,  $-NR_CC(=O)-$ ,  $-NHS(O)_m-$ ,  $-C(=O)NHS(O)_m-$ , and  $-NR_CS(O)_m-$  (where  $m$  is 0, 1, or 2); and

$R_B$  and  $R_C$ , which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy,  $-O(C_1-C_6 \text{ alkyl})$ ,  $-NH(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ ,  $-NHC(O)(C_1-C_6 \text{ alkyl})$ ,  $-N(C_1-C_6 \text{ alkyl})C(O)(C_1-C_6 \text{ alkyl})$ ,  $-NHS(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_x(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xNH(C_1-C_6 \text{ alkyl})$ ,  $-S(O)_xN(C_1-C_6 \text{ alkyl})(C_1-C_6 \text{ alkyl})$ , (where  $x$  is 0, 1, or 2).

31. A compound according to Claim 30 wherein:

$R_3$  and  $R_4$  are the same or different and represent hydrogen or methyl;

$R_5$  and  $R_6$  are the same or different and represent hydrogen or methyl; and

$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently selected at each occurrence from hydrogen and methyl.

32. A compound according to Claim 30 wherein:

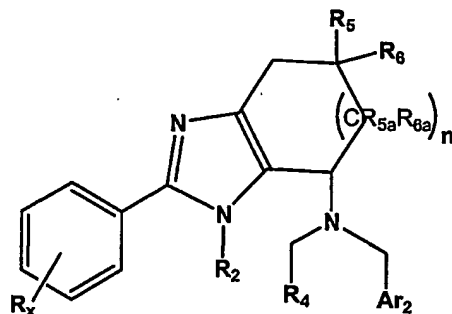
$R_3$  and  $R_4$  are hydrogen;

$R_5$  and  $R_6$  are the same or different and represent hydrogen or methyl; and

$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently selected at each

occurrence from hydrogen and methyl.

33. A compound according to Claim 30 of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

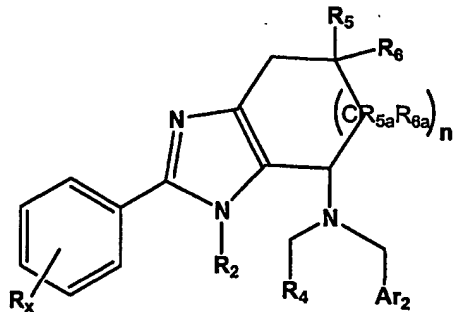
$R_2$ ,  $R_4$ ,  $Ar_2$ , and  $n$  are as defined for Claim 30;

$R_5$  and  $R_6$  are the same or different and represent hydrogen or methyl;

$R_{5a}$  and  $R_{6a}$  are the same or different, and are independently chosen at each occurrence from hydrogen and methyl; and

$R_x$  represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy,  $C_1$ - $C_6$  alkyl,  $C_2$ - $C_6$  alkenyl,  $C_2$ - $C_6$  alkynyl,  $C_1$ - $C_6$  alkoxy, amino, mono- or di( $C_1$ - $C_6$ )alkylamino, and amino( $C_1$ - $C_6$ )alkoxy.

34. A compound according to Claim 32, of the formula:



or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

$R_4$ ,  $Ar_2$ , and  $n$  are as defined for Claim 30;

$R_2$  is  $C_3$ - $C_8$  straight or branched chain alkyl,  $C_2$ - $C_8$  alkenyl, or  $C_2$ - $C_8$  alkynyl;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen or methyl.

R<sub>5a</sub> and R<sub>6a</sub> are the same or different, and are independently chosen at each occurrence from hydrogen and methyl; and

R<sub>x</sub> represents up to four substituents independently chosen from hydrogen, halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, and amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy.

35. A compound according to Claim 33,

or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

Ar<sub>2</sub>, R<sub>x</sub>, and n are as defined for Claim 30

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl; and

R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl.

36. A compound according to Claim 33,

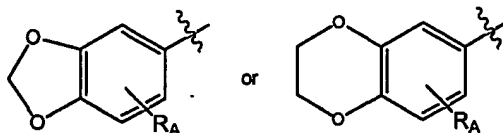
or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;

R<sub>4</sub> is phenyl, which may be unsubstituted or substituted with:

C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub> cycloalkyl)C<sub>1</sub>-C<sub>4</sub> alkyl, haloalkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino; or

R<sub>4</sub> is a bicyclic oxygen containing group of the formula:

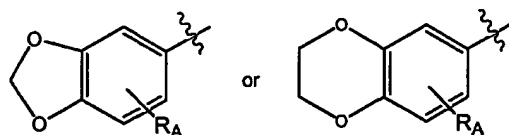


wherein R<sub>A</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, (C<sub>3</sub>-C<sub>8</sub>cycloalkyl) C<sub>1</sub>-C<sub>4</sub> alkyl, haloalkyl, alkoxy, halogen, hydroxy, amino, or mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino;

Ar<sub>2</sub> is phenyl which is unsubstituted or optionally substituted or substituted with up to four groups independently selected from:

halogen, C<sub>1</sub>-C<sub>7</sub> alkyl, C<sub>1</sub>-C<sub>7</sub> alkoxy, cyano, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or dialkylaminocarbonyl, N-alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidinyl, 1-piperidyl, 1-morpholino, nitro, hydroxy, acetoxy, trifluoromethyl, and trifluoromethoxy or -X<sub>4</sub>R<sub>B</sub>, wherein X<sub>4</sub> and R<sub>B</sub> are as defined for Claim 33; or

Ar<sub>2</sub> is a bicyclic oxygen-containing group of the formula:



wherein  $R_A$ ,  $R_A'$ , and  $n$  are as defined in Claim 33.

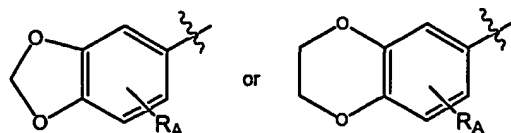
37. A compound according to Claim 33,

or a pharmaceutically acceptable salt, prodrug or hydrate thereof, wherein:

**R<sub>2</sub> is C<sub>3</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;**

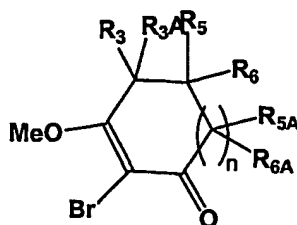
**R<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub> straight or branched chain alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, or C<sub>2</sub>-C<sub>8</sub> alkynyl;**

**Ar<sub>2</sub> is a bicyclic oxygen containing group of the formula:**



wherein  $R_A'$  and  $n$  are as defined for Claim 33.

38. A compound of the formula:



wherein:

n is an integer from 0 to 3;

R<sub>3</sub> and R<sub>3A</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

R<sub>3</sub> and R<sub>3A</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a cycloalkyl ring; and

R<sub>5A</sub> and R<sub>6A</sub> are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy.

39. A compound according to Claim 38, wherein:

R<sub>3</sub> and R<sub>3A</sub> are the same or different and represent hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl; or

R<sub>3</sub> and R<sub>3A</sub>, taken together with the carbon atom to which they are attached, form a cycloalkyl ring of from three to six carbon atoms;

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a cycloalkyl ring of from three to six carbon atoms; and

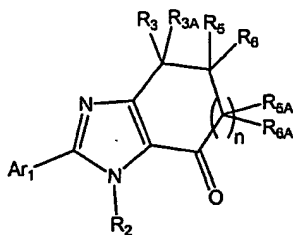
R<sub>5A</sub> and R<sub>6A</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy.

40. A compound according to Claim 38, wherein:

R<sub>3</sub> and R<sub>4</sub> are hydrogen; and

R<sub>5</sub>, R<sub>6</sub>, R<sub>5A</sub>, and R<sub>6A</sub> are the same or different and represent hydrogen or methyl.

41. A compound of the formula:



wherein:

$n$  is an integer from 0 to 3;

$R_2$  is alkyl, alkenyl, alkynyl, cycloalkyl, (cycloalkyl)alkyl, or haloalkyl, each of which may be substituted or unsubstituted;

$R_3$  and  $R_4$  are the same or different and represent hydrogen or alkyl; or

$R_3$  and  $R_{3a}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_5$  and  $R_6$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; or

$R_5$  and  $R_6$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring;

$R_{5a}$  and  $R_{6a}$  are the same or different and represent hydrogen, halogen, hydroxy, alkyl, or alkoxy; and

$Ar_1$  is ethylenedioxyphenyl, methylenedioxyphenyl, or;

$Ar_1$  is unsubstituted or substituted carbocyclic aryl, unsubstituted or substituted arylalkyl, or a unsubstituted or substituted heteroaromatic or heteroalicyclic group having from 1 to 3 rings, 3 to 8 members in each ring and from 1 to 3 hetero atoms.

42. A compound according to Claim 41 in which:

$R_2$  is  $C_1$ - $C_8$  straight or branched chain alkyl,  $C_2$ - $C_8$  alkenyl,  $C_2$ - $C_8$  alkynyl,  $C_3$ - $C_8$  cycloalkyl,  $C_2$ - $C_8$  (cycloalkyl) $C_1$ - $C_4$  alkyl, or  $C_1$ - $C_8$  haloalkyl;

$R_3$  and  $R_{3a}$  are the same or different and represent hydrogen or  $C_1$ - $C_6$  alkyl; or

$R_3$  and  $R_{3a}$ , taken together with the carbon atom to which they are attached, form a cycloalkyl ring of from three to six carbon atoms; and

R<sub>5</sub> and R<sub>6</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy; or

R<sub>5</sub> and R<sub>6</sub>, taken together with the carbon atom to which they are attached form a cycloalkyl ring of from three to six carbon atoms;

R<sub>5A</sub> and R<sub>6A</sub> are the same or different and represent hydrogen, halogen, hydroxy, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy;

Ar<sub>1</sub> is ethylenedioxyphenyl, methylenedioxyphenyl, phenyl, thienyl, or pyridyl, pyrimidyl, dihydrobenzofuranyl, furanyl, benzodioxanyl, indolyl, each of which is unsubstituted or substituted with up to four substituents independently selected from:

halogen, nitro, cyano, trifluoromethyl, trifluoromethoxy, haloalkyl, hydroxy, acetoxy, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or di(C<sub>1</sub>-C<sub>6</sub>)alkylamino, amino(C<sub>1</sub>-C<sub>6</sub>)alkoxy, carboxylic acid, esters of carboxylic acids, aminocarbonyl, mono or di(C<sub>1</sub>-C<sub>6</sub>)alkylaminocarbonyl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylsulfonylaminocarbonyl, 1-azetidiny, 1-pyrrolidiny, 1-piperidyl, and -X<sub>4</sub>R<sub>B</sub>, wherein X<sub>4</sub> and R<sub>B</sub> are as defined below;

X<sub>4</sub> is independently selected at each occurrence from the group consisting of -CH<sub>2</sub>-, -

CHRC-, -O-, -S(O)<sub>m</sub>-, -NH-, -NRC-, -C(=O)NH-, -C(=O)NRC-, -S(O)<sub>m</sub>NH-, -S(O)<sub>m</sub>NRC-, -NHC(=O)-, -NRC(=O)-, -NHS(O)<sub>m</sub>-, -C(=O)NHS(O)<sub>m</sub>-, and -NRC(S(O)<sub>m</sub>- (where m is 0, 1, or 2); and

R<sub>B</sub> and R<sub>C</sub>, which may be the same or different, are independently selected at each occurrence from the group consisting of:

hydrogen, straight, branched, or cyclic alkyl groups, which may contain one or more double or triple bonds, each of which may unsubstituted or substituted with one or more substituent(s) selected from:

oxo, hydroxy, -O(C<sub>1</sub>-C<sub>6</sub> alkyl), -NH(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHC(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -N(C<sub>1</sub>-C<sub>6</sub> alkyl)C(O)(C<sub>1</sub>-C<sub>6</sub> alkyl), -NHS(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -S(O)<sub>x</sub>(C<sub>1</sub>-C<sub>6</sub> alkyl), -